northern telecom

norstar

Norstar Modular
Simply the best connection to a network of communication.

Connect with network capabilities that answer your needs.

Norstar Modular offers the benefits of integrating Norstar digital superiority and easy-to-use features with private and public networks, or other Norstar systems, for large-scale communication solutions - and simply the best way to link numerous departments or locations to capabilities that answer your needs.

Expand your communications to save time and money.

Norstar Modular is the ideal system to support the dedicated connectivity of a private network. Norstar 'Tie Line' networking between geographically diverse locations reduces the time and costs associated with traditional large volume voice and data exchange.

Norstar Modular's ability to deliver Direct Inward System Access (DISA), with 6 digit password restrictions if desired, enables field or branch staff to call in and use Norstar system features - including access to specific telephone set locations, paging and Norstar outgoing lines - without encumbering system attendants with physically handling these calls.

Norstar Modular's support of Direct Inward Dialing (DID) encourages clients and suppliers to call dedicated lines for specific purposes - customer service, sales, operations, accounting - without unnecessary call handling by system attendants.

Norstar Modular's powerful simplicity also works to maximize convenience and productivity through such unique features as External Call Forwarding, and Unsupervised Call Conferencing among internal and external parties.

Get efficiency on the phone, fast!

Now, one trunk line doesn't have to represent one telephone set. Norstar Modular lets you concentrate more telephone sets on fewer trunks, including Tie Lines, for greater system efficiencies and cost savings.

Up to 104 lines can be dedicated to automatically connect incoming DID, DISA and Tie Lines directly to internal Norstar sets including secondary system attendants such as departmental answering positions, or multi-set locations as found in a customer service department. As a result, the workload of a Central Answering Position is significantly reduced and overall call handling responsiveness is dramatically enhanced.

Depending on system configuration, as many as 80 lines are available for outgoing or other incoming call traffic, thus facilitating speedy client, supplier, inter-branch or inter-departmental contact.

Control system costs with more security.

Norstar Modular networking enhancements include virtually unlimited flexibility to assign a dialing filter - a collection of dialing restrictions or exceptions - to one or more sets, lines, or each line on a specific set. Up to 100 different dialing filters, and a total of 400 individual entries, may be applied to both incoming and outgoing line users.

Similarly, access to system resources such as DISA and Tie Lines can be controlled according to need through the assignment of Class of Service passwords.

Simply the best

Northern Telecom is dedicated exclusively to the development of quality telecommunications products. When you choose a Norstar product, you get capabilities you can rely on now, and for many years to come.

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Series 3200 Eng

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norstar MEMORANDUM

SUBJECT: NORSTAR INFORMATION TOOLS

Enclosed for your information /utilization is the Norstar DR4 manual. This document is comprised of the following 5 sections:

- Section 1 - Channel Introduction Package
- Section 2 - Sales & Marketing Bulletins
- Section 3 - Overhead Presentation & Presentation Notes
- Section 4 - Technical Overview
- Section 5 - Technical Training Course

In addition to the aforementioned I have also included the following:

- Norstar International New Letter - I will continue to send these to you as they are issued
- Norstar Modular DR4 Insert for brochures - which can now be ordered in the same way you currently order other collaterals
- The IVQ issue of "Universe" - this has an article relating to excellence and Norstar, as well as a a "frameable" last page which depicts an interesting Norstar!

I will continually update you on information as it becomes available. All of the information you have recieved from me recently, Startalk 2.0, Enhanced ATA, DR2,DR3, & Centrex Feature and Programming Overview, Features and Benefits Reference Guide, Custom Business Products and Data Connectivity Presentations, and DR4 manual ,are being translated into Spanish and will be available early next year. These documents will be placed in manuals and can be considered the new "handbooks" as they will contain the latest information available and will be updated as new information is generated.

Please distribute these materials as required. Thank-you

Natalie Reeves-Lopez (X8465)
Norstar Product Manager
Natalie

NORSTAR
MODULAR DR4

CHANNEL INTRODUCTION PACKAGE

November 1991

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INTRODUCTION

INTRODUCTION

This Channel Introduction Plan is designed to assist our NT CALA distributors/customers in the standardization of Modular DR4 Software, E&M/DISA Trunk Cartridges, and DID Trunk Cartridges. It provides all the related information required for a basic overview of the product. In reviewing this document however, please be aware of your own country specific applications, as certain signalling required from the Central Office may not be available in your area. If you require further information or on-going support, please refer to the list of contact names and telephone numbers in the 'Contact List' section of this document.

The Channel Introduction Plan answers the following questions:

- **Product Description** - What is the product? What features does it have compared to previous product offerings?
- **Compatibilities** - What works with what?
- **Market Positioning and Target Markets** - How does it fit into the Norstar product line? How does it compare to the competition? In which markets should we focus our efforts ?
- **Costing and Ordering Information** - What is theStandard cost? How do I go about ordering? What parts do I need to order? What are the appropriate ordering codes?
- **Documentation** - What documentation comes with Modular DR4 Software, the E&M Trunk Cartridge and the DID Trunk Cartridge? What additional documentation is available for order?
- **Marketing and Introduction Support** - What material will be available for sales personnel?
- **Training** - What type of technical training is available? What type of sales training is available?
- **Contact List** - Whom can I contact if I need further information?

DESCRIPTION

PRODUCT DESCRIPTION

Background

Norstar Modular Release 4 is a new software release for new and installed Norstar Modular systems. It was designed to allow Norstar to be part of a private network. Norstar can be connected to an existing private network, or to other Norstar systems to form a Norstar Network.

Several new capabilities and features are added in DR4 to support networking and larger systems. These include:

- E&M trunking for private network connectivity
- Direct Inward System Access (DISA) for public access to the private network
- Direct Inward Dialing (DID) for public access to specific Norstar users
- Enhanced Restriction Capabilities
  - Dialing Filters
  - Class of Service
- Selective Line Redirection
- Unsupervised Conference
- Multiple Attendant (Direct-Dial) Sets
- Increased Number of Line Pools
- Flexible Numbering Plan Extensions
  - Direct-Dial Digit
  - Call Park Prefix Digit

Basic Concepts

A. Network Connectivity

Networking capabilities were designed assuming that the primary market for Norstar was as an end point in an intelligent private network . Thus no support is provided for network features or a coordinated dialing plan.

Norstar could act as a tandem node for a simple network, but again with no coordinated or uniform dialing plan or cross-network feature support.

B. Lines vs Trunks

Prior to DR4, a telephone number dialed by an external caller was associated with a specific physical trunk and the call alerted at any set having an appearance of that trunk (the indicator would flash at the appropriate line key and ringing would occur, if ringing was administered). Basically, there was a fixed, one-to-one relationship between the physical trunk and the line key on which the call was presented. The terms 'line' and 'trunk' were used interchangeably.

In DR4, however, these basic concepts have been altered. Now it is possible to have a one-to-many or a many-to-one relationship between trunks and lines. Therefore, it is important to distinguish these terms.

For DR4:
A trunk is the physical connection between a Norstar system and other systems (Norstar or otherwise) in a private or public network.
A line is a communication path between the end-user and the outside world

C. Target Lines

A target line is a specific communication path reached by means of digits received from an incoming trunk. Target lines are used to answer incoming calls, but can not be used to make outgoing calls.

Other than its restriction for incoming calls only, a target line has all the same functionality as a "regular" line. A target line can easily be identified by its number, being from 81- 184, vs "regular" lines, which are numbered 1-80.

Because "received digits" are mapped onto target lines, the Norstar numbering plan does not have to match the digits provided by the CO.

D. Manual Answer Trunk

Calls on manual answer trunks are routed and answered in the "traditional" way. That is, a call on a manual answer trunk will alert at all appearances of that trunk, and a connection is not made between the external caller and Norstar until the call is physically answered by a Norstar user.

E. Auto Answer Trunk

Incoming calls on auto answer trunks are answered by the Norstar system. The Norstar system then processes the call based on the digits received from the far end, typically routing the call to a specific target line.

Auto answer trunks provide for automated routing of calls to different destinations depending on the digits dialed. The destination is usually a target line (a virtual line) which can be assigned to telephones in the same way as a physical line. Target lines provide for attendant bypass (calling directly to a specific department or individual) and line concentration (one trunk can fan out to many target lines)

F. E&M Trunks

E&M trunks connect the system directly in a private network.

E&M trunks can operate in manual answer mode or in auto-answer mode with disconnect supervision. Manual answer E&M trunks alert at any telephone with an appearance of the trunk.

G. DID Trunks

DID trunks handle only incoming external calls. The digits received from the central office are used typically to route calls to a target line. The DID call appears at every telephone configured with an appearance of that target line.

Any appearance of a DID trunk can be used only to monitor activity of the trunk, not to answer an incoming call.

User Access

Norstar users have access to:

- the private network via E&M trunks
- the public network via loop start trunks.

Users on the private network have access to:

- Norstar users via E&M trunks
- Norstar features via E&M trunks
- the private network via tandem access on E&M trunks
- the public network via tandem access on loop start trunks.

Remote Users on the public network have access to:

- Norstar users via loop start trunks and DID trunks
- Norstar features via loop start trunks and DID trunks
- the private network via loop start trunks and DID trunks with DISA (including tandem access to E&M trunks)
- the public network via loop start trunks and DID trunks with DISA (including tandem access to loop start trunks).

Component Description

DR4 Software Cartridge

The DR4 software cartridge follows the same design as the DR3 software cartridge: a ROM section which contains the system features portion of the software, and an NVRAM section which contains the customer programming. Therefore, a system being upgraded from DR3 to DR4 requires only the ROM portion of the software cartridge.

E&M/DISA Trunk Cartridge

This trunk cartridge fits into the standard Modular Trunk Module. Any combination of disconnect Supervision loop start trunk cartridges, E&M/DISA trunk cartridges, and DID trunk cartridges can be placed in the same trunk module, to a maximum of three trunk cartridges per trunk module.

Each E&M/DISA trunk cartridge provides the connections for 2 E&M trunks and 2 DTMF receivers for DISA. The E&M trunk type is Type II, four wire (four wires for connection to Norstar, four wires for connection to the CO).

DID Trunk Cartridge

The DID trunk cartridge fits into the standard Modular Trunk Module. Any combination of disconnect Supervision loop start trunk cartridges, E&M/DISA trunk cartridges, and DID trunk cartridges can be placed in the same trunk module, to a maximum of three trunk cartridges per trunk module.

Each DID trunk cartridge provides the connections for 4 DID trunks. It is possible to configure a Modular DR4 system to have DISA capability without an E&M/DISA trunk cartridge if the system has a DID trunk cartridge.

PRODUCT SPECIFICATIONS AND RATINGS

Technical specifications

The following information lists technical specifications for the Norstar Modular 110V and 220V N.A. systems.

Power specifications for the 110V N.A.system

Characteristic	KSU	TM	SM
Voltage V ac	92-127	92-127	92-127
Current A rms (max)	1.75	1.75	1.0
Frequency Hz	47-63	47-63	47-63
Crest Factor	4.0	4.0	4.0

Power specifications for the 220V N.A.system

Characteristic	KSU	TM	SM
Voltage V ac	170-264	170-264	170-264
Current A rms (max)	1.0	1.0	0.5
Frequency Hz	45-63	45-63	45-63
Crest Factor	4.0	4.0	4.0

Telephone loop power for 110 V and 220V N.A.systems

Characteristic	Value
Loop resistance	50 ohms (295 m of 0.5 mm wire or 1000 ft of 24 AWG wire)
Loop length	150 ohms per conductor between TC and network interface for E, SG, M and Sb leads on an E&M/DISA Tc
Terminating impedance	600 ohms
Flash rate (incoming alerting call)	1 Hz (50% duty cycle)
Minimum voltage at telephone	10 V dc
Current at telephone (idle)	45 mA nominal
Current at telephone (active)	80 mA maximum

Environmental specifications for 110 V and 220V N.A. systems

Characteristic	Value
Operating temperature range	0°C to 50°C (32°F to 122°F)
Storage temperature range	-55°C to 70°C (-67°F to 158°F)
Humidity	5% to 95% (non-condensing)

Service tone cadence for 110 V and 220V N.A. systems

Tone	Cadence (seconds)
Busy	0.5 ON/ 0.5 OFF
Overflow	0.25 ON/0.25 OFF
Ringback	2.0 ON/4.0 OFF
Confirmation tone	1.0 ON/ 1.0 OFF (3 bursts followed by no tone)
Recall tone	1.0 ON/ 1.0 OFF (3 bursts followed by steady tone)
Ring splash	.02 ON (1 burst)

Regulatory requirements

Interconnect

Norstar Modular equipment meets all applicable requirements of both the Canadian Department of Communications CS-03 and US Federal Commission FCC part 68 and has been registered under files:
DOC 3322492A and FCC AB67UJ-17156-KF-E (key system) and AB67UJ-17338-MF-E (hybrid system).

Electromagnetic compatibility (EMC)

Radiated emissions

Norstar Modular equipment meets all FCC part 15, subpart J, class A radiated emissions requirements as shown on the next page:

Frequency range	Field Strength (mV/m) at 30 m
30-88 MHz	30
88-216 MHz	50
216-1000 MHz	70

Conducted emissions

Norstar Modular equipment meets all FCC part 15, subpart J, class A conducted emissions requirements

Safety

Norstar Modular equipment meets all applicable requirements of both the Canadian Standards Association C22.2 No. 0.7 M1985 and US Underwriter's Laboratory UL-1459, issue 1, and has been registered under files: CSA LR58855-12 and UL E115515 88NK16650.

Electrical requirements

Electrostatic discharge

The Norstar Modular KSU and telephones meet IEC 801-2 severity level 4. Specifically, there is no malfunction or discharge up to 12 kV with a 150 ohm/150 pF probe. Connectors meet IEC 801-2 severity level 2.

Electromagnetic compatibility - Immunity

Radiated Immunity

Norstar Modular equipment can function correctly when exposed to RF fields up to 5 V/m over the frequency range of 10 kHz to 1 GHz.

Conducted Immunity

Norstar Modular equipment can function correctly when exposed to RF signal on the external lines with a common mode voltage of 2 V rms or a common mode current of 86 dBmA over a frequency range of 0.06 to 0.1 MHz and 92 dBmA over remaining frequencies in the 0.01 to 30 MHz range.

Mechanical requirements

Norstar Modular equipment meets the requirements shown below:

Mechanical Requirements	
Vibration operational	IEC 68-2-6-Fc
Resonance search	IEC 68-2-6-Fc
Vibration endurance transportation	IEC 68-2-6-Fc
Bounce	IEC 68-2-55 A
Shock fragility	IEC 68-2-27-Ea
Unpacked drop	IEC 68-2-31-Ec
Packaged drop	NSTA Proj. 1A

Transportation methods

No special constraints need be applied to standard methods of shipment (such as air freight, truck, and rail) except for the -55°C (-67°F) storage limit.

Environmental requirements

Norstar Modular equipment can operate in the temperature range 0°C to 50°C (32°F to 122°F). In addition, it can withstand storage in the temperature range of -55°C to +70°C (-67°F to 158°F) and thermal shocks from sudden temperature changes from -55°C (-67°F) to room ambient and +70°C (158°F) to room ambient.

The following details apply:

- Low temperature operation (0°C;32°F) as per I.E.C. 68-2-1 Test Ad.

- Low temperature storage (16 hrs) at (-55°C; -67°F) as per I.E.C. 68-2-1 Test Ad.

- High temperature operation (50°C; 122°F) as per I.E.C. 68-2-2 Test Bd. Methods A.

- High temperature storage (16 hrs at +70°C; 158°F) as per I.E.C. 68-2-12 Test Bd.

-Temperature shock (-55°C to +25°C) (-67°F to +77°F) as per I.E.C. 68-2-14 Test Na, 5 cycles.

- Temperature shock (+70°C to +25°C) (158°F to +77°F) as per I.E.C. 68-2-14 Test Na, 5 cycles.

Humidity

Norstar Modular equipment can operate from 0°C to 50°C (32°F to 122°F) with relative humidities between 5% and 95% RH except that at temperatures above 34°C (93°F) the relative humidity may be limited to 52 mbar of water vapor pressure.

For the purpose of demonstration of compliance, the product shall be exposed to 40°C (104°F) at 90% to 95% RH for 3 days followed by operational tests.

In addition, the product (without its transportation package) shall be able to withstand 10 days storage at 40°C (104°F) at 90% to 95% RH as per I.E.C. 68-2-3, Test Ca, Severity A, without evidence of corrosion, physical damage or degradation in electrical performance.

CONNECTIONS AND INTERFACES

Each line/trunk terminates at a distribution block and is cross connected to one 25-pair cable from a Trunk-Module or from the KSU.

When installing a mixture of E&M/DISA and DID or Loop Start TCs, it is important to cross-connect the wiring for each type of TC to a separate distribution block.

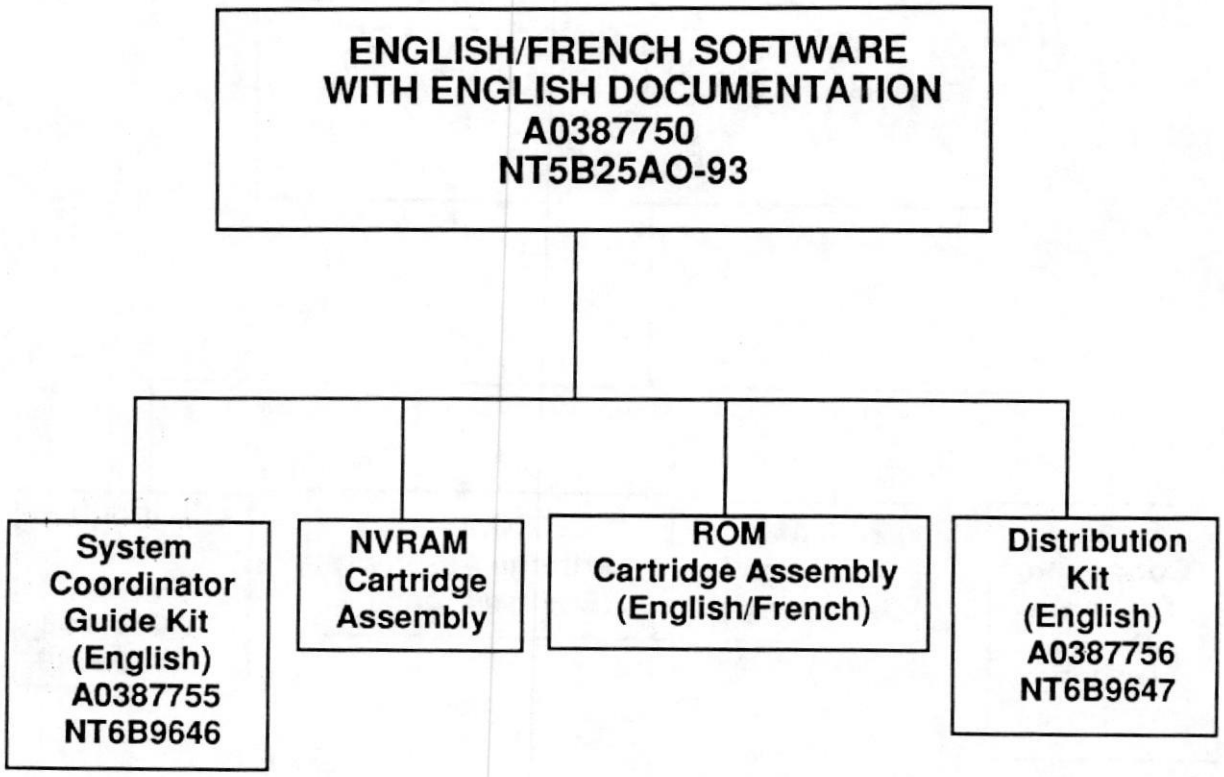
In addition, the cross-connections to each distribution block must always begin at pins 1 and 26. This allows you to wire to the correct pins for an RJ-21/CA-21 connection and for an RJ2HX/CA2HA connection.

MEAN TIME BETWEEN FAILURES

DR4 Software Cartridge	
ROM	150 years
NVRAM	121 years
Complete Cartridge (ROM + NVRAM)	67 years
E&M/DISA Trunk Cartridge	91 years
DID Trunk Cartridge	73 years

PRODUCT STRUCTURE

ENGLISH/FRENCH SOFTWARE WITH ENGLISH DOCUMENTATION



PRODUCT STRUCTURE

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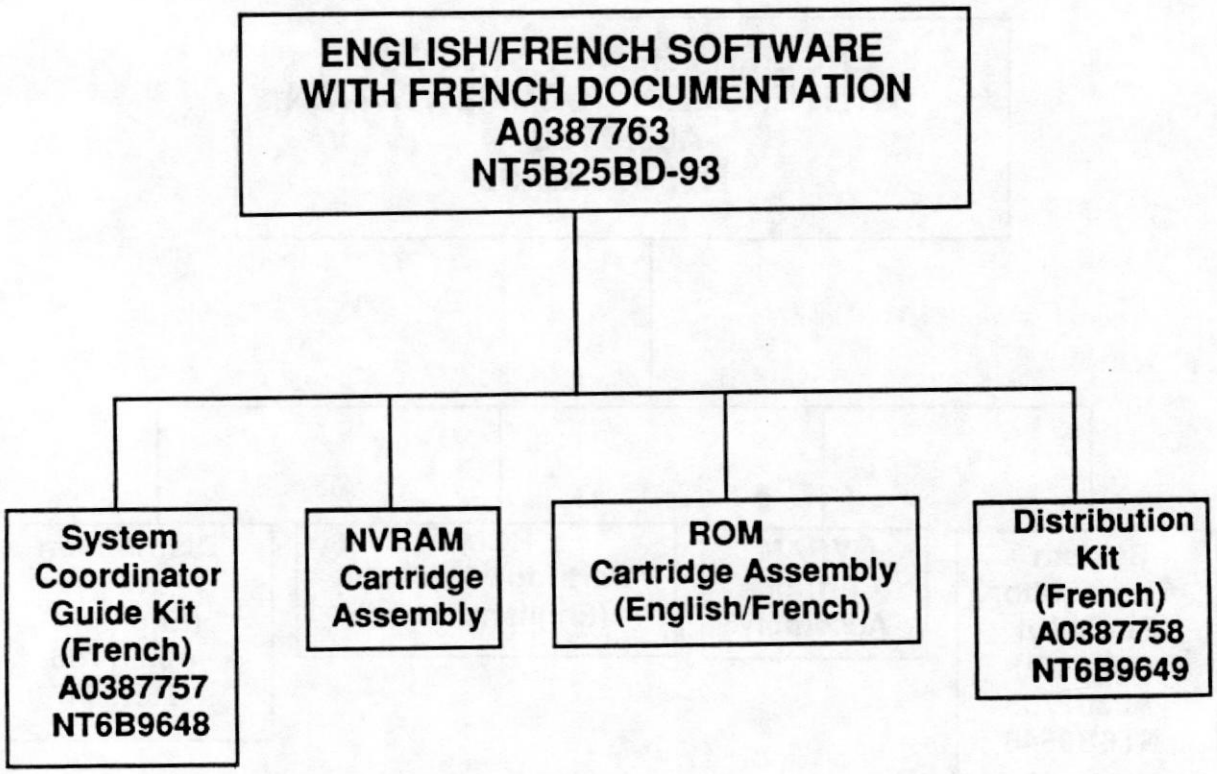

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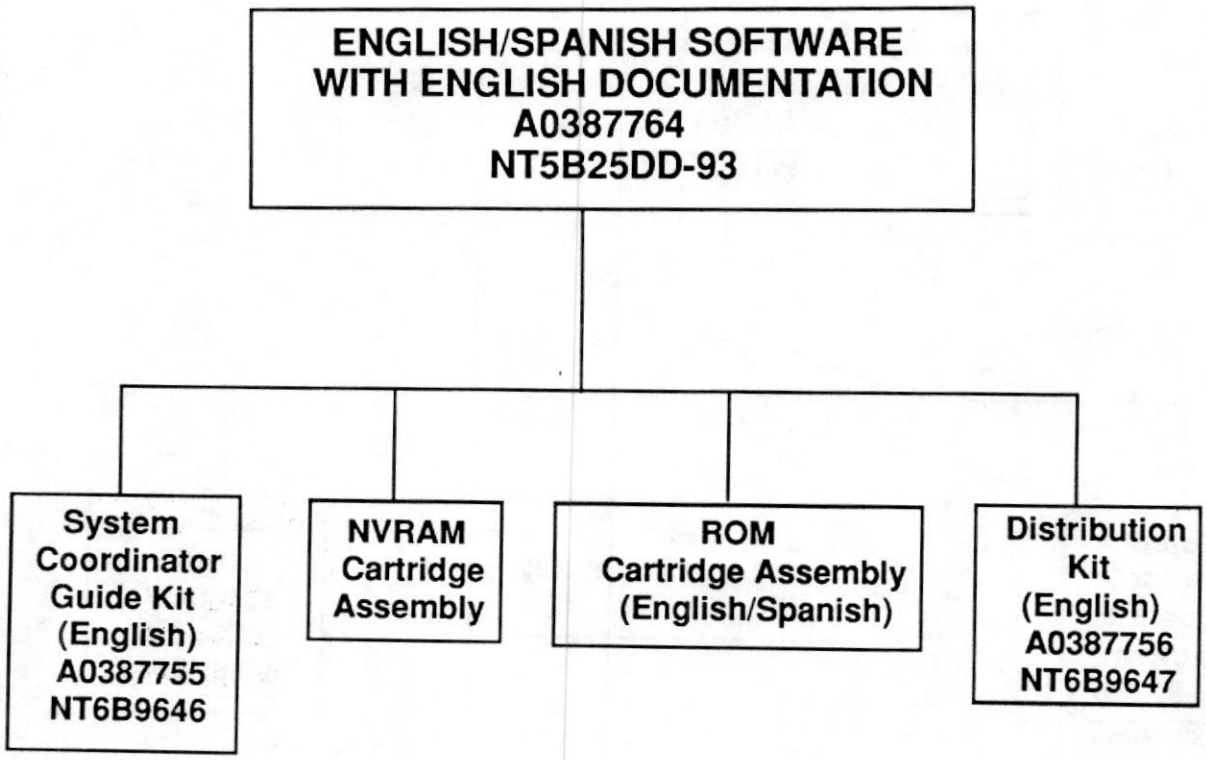

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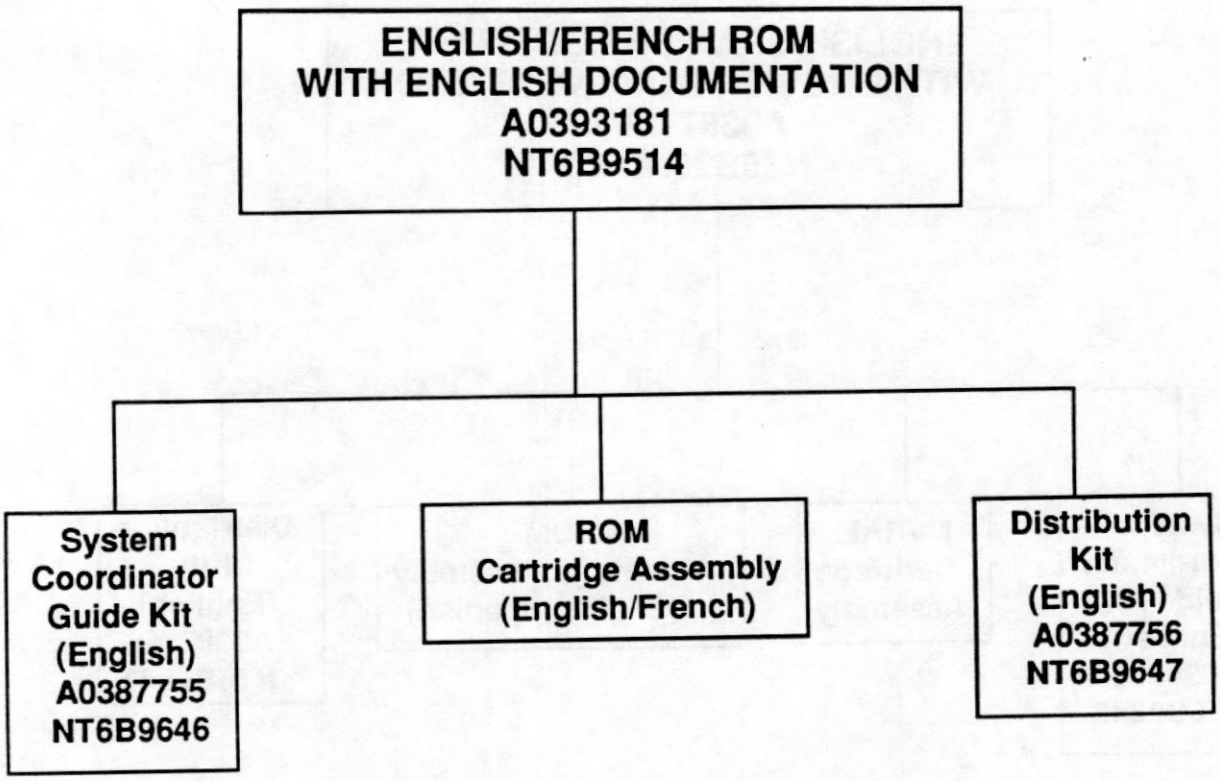

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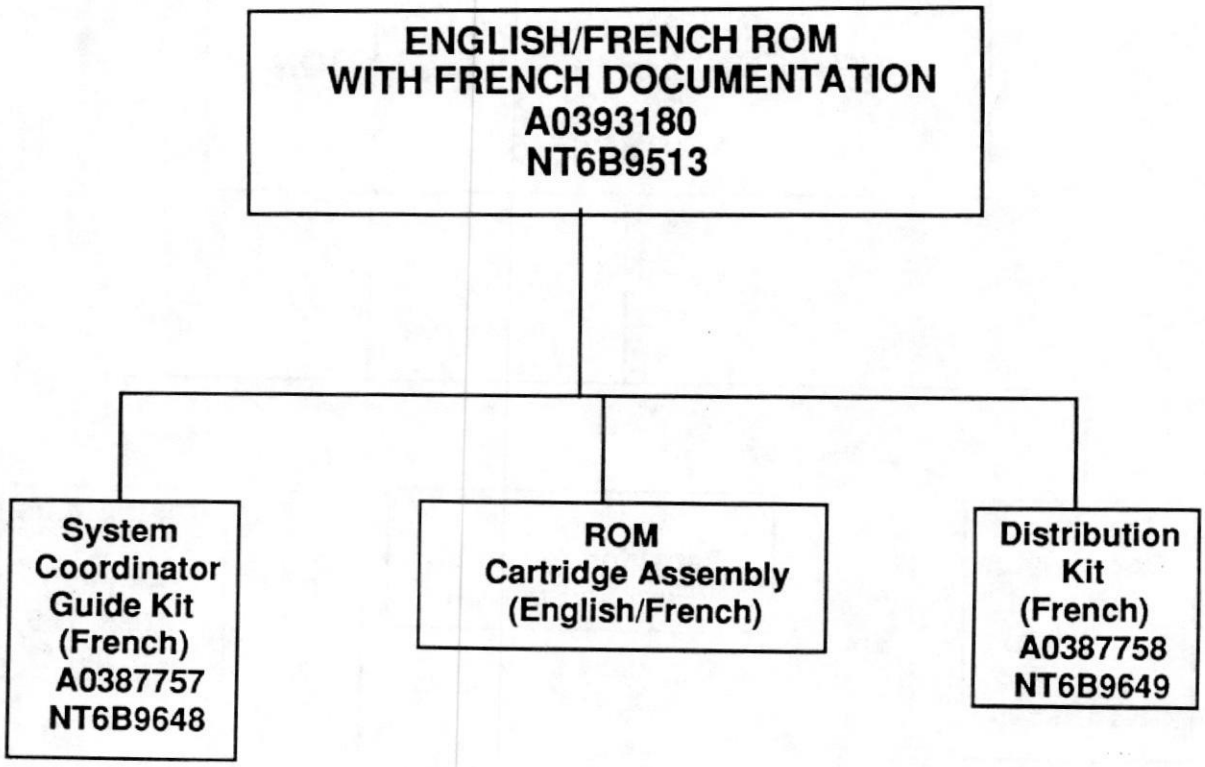
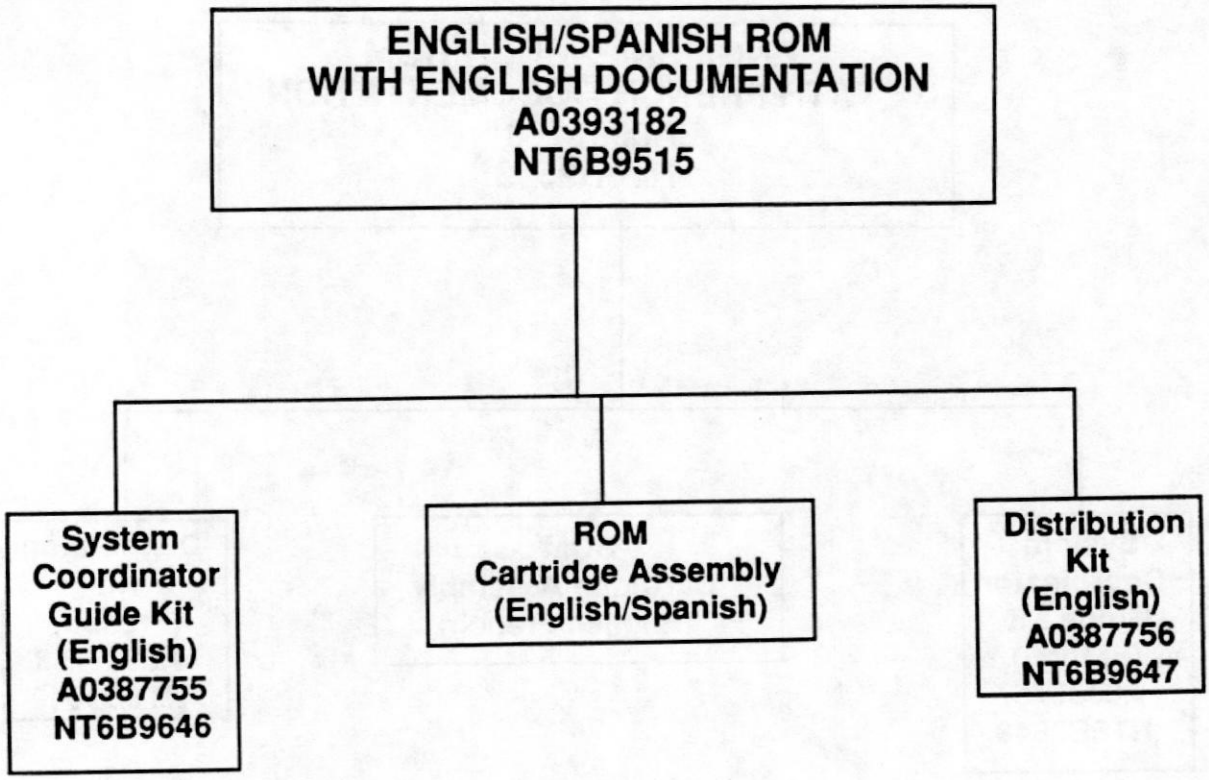


PRODUCT STRUCTURE

ENGLISH/SPANISH ROM WITH ENGLISH DOCUMENTATION



FEATURE MATRIX

FEATURE NAME	MODULAR DR2	MODULAR DR3	CENTREX	MODULAR DR4
access signalling:				
Centrex/PBX reach through	yes	yes	yes	yes
end to end signalling	yes	yes	yes	yes
accidental disconnect protection	yes	yes	yes	yes
answer groups	yes	yes	yes	yes
autodial buttons	yes	yes	yes	yes
number of digits	16	24	24	24
including stored facility access	no	yes	yes	yes
automatic line selection	yes	yes	yes	yes
automatic set relocation	yes	yes	yes	yes
auxiliary ringer interface	yes	yes	yes	yes
background music	yes	yes	yes	yes
busy lamp indication	yes	yes	yes	yes
button inquiry	yes	yes	yes	yes
including autodial numbers	no	yes	yes	yes
call duration timer	yes	yes	yes	yes
call forward				
call forward all calls	yes	yes	yes	yes
call forward busy	no	yes	yes	yes
call forward no answer	yes	yes	yes	yes
call forward override	yes	yes	yes	yes
call identification/call status display	yes	yes	yes	yes
call park (with callback)	yes	yes	yes	yes
call park prefix	1	1	1	0-9,none
call pickup				
call pickup - group	yes	yes	yes	yes
call pickup - directed	yes	yes	yes	yes
trunk answer from any station	yes	yes	yes	yes
call queueing	no	yes	yes	yes
camp on	no	yes	yes	yes
class of service	no	no	no	yes
conference (including consultation)	yes	yes	yes	yes
contrast adjustment	yes	yes	yes	yes
delay ring transfer	yes	yes	yes	yes
dial intercom	yes	yes	yes	yes
dial "0" station	yes	yes	yes	yes
direct dial digit	0	0	0	0 - 9
DID capability	no	no	no	yes
direct station selection (DSS)	yes	yes	yes	yes
DISA access	no	no	no	yes
disconnect supervision	no	yes	yes	yes
discriminating ring cadences	yes	yes	yes	yes
distinctive ringing	yes	yes	yes	yes
do not disturb	yes	yes	yes	yes
E&M trunk interface	no	no	no	yes
emergency transfer/power fail cut-through	yes	yes	yes	yes
end-to-end signalling:				
internal	no	yes	yes	yes
external	yes	yes	yes	yes

FEATURE NAME	MODULAR DR2	MODULAR DR3	CENTREX	MODULAR DR4
external line access	yes	yes	yes	yes
flexible call restrictions				
tables	yes	yes	yes	no
filters	no	no	no	yes
flexible call restriction overrides	yes	yes	yes	yes
including system speed dial	no	yes	yes	yes
flexible numbering plan	yes	yes	yes	yes
number of digits	2 - 4	2 - 7	2 - 7	2 - 7
group listening	no	yes	yes	yes
handsfree:				
handsfree answerback	yes	yes	yes	yes
automatic handsfree	no	yes	yes	yes
handsfree with mute capability	yes	yes	yes	yes
headset interface - built-in	yes	yes	yes	yes
hearing aid compatibility (FCC p.68.316)	yes	yes	yes	yes
hold:				
automatic hold	yes	yes	yes	yes
autohold full	yes	yes	yes	yes
I-hold/U-hold/mutual hold	yes	yes	yes	yes
exclusive hold	yes	yes	yes	yes
held line reminder	yes	yes	yes	yes
hot line	no	yes	yes	yes
language choice	yes	yes	yes	yes
last number redial	yes	yes	yes	yes
line button relocation	no	yes	yes	yes
line pool(s)	yes	yes	yes	yes
line profile	yes	yes	yes	yes
link/recall	yes	yes	yes	yes
listen on hold	yes	yes	yes	yes
maintenance:				
alarms	yes	yes	yes	yes
system versions	yes	yes	yes	yes
port/DN status	yes	yes	yes	yes
module status	yes	yes	yes	yes
diagnostics - connectivity test	yes	yes	yes	yes
history files - test log, admin log	yes	yes	yes	yes
manual line selection	yes	yes	yes	yes
messages (send,waiting,reply)	yes	yes	yes	yes
multiple attendant (dial "0") sets	no	no	no	yes
multiple line access	yes	yes	yes	yes
music/tone/silence on hold	yes	yes	yes	yes
night service:				
night service set	yes	yes	yes	yes
service modes	no	yes	yes	yes
onhook dialing:				
dial pad modes	no	yes	yes	yes
standard dial	yes	yes	yes	yes
automatic dial	no	yes	yes	yes
predial	no	yes	yes	yes
paging:				
external	yes	yes	yes	yes
internal multiple zones	yes	yes	yes	yes

FEATURE NAME	MODULAR DR2	MODULAR DR3	CENTREX	MODULAR DR4
remote access to paging	no	no	no	yes
pause	yes	yes	yes	yes
pre-selection/call screening	yes	yes	yes	yes
prime line	yes	yes	yes	yes
prime set(s)	yes	yes	yes	yes
priority call	yes	yes	yes	yes
privacy:	yes	yes	yes	yes
privacy control	no	yes	yes	yes
private lines	yes	yes	yes	yes
pulse/tone dialing	yes	yes	yes	yes
release	yes	yes	yes	yes
restriction override passwords(s)	yes	yes	yes	yes
ring again:	yes	yes	yes	yes
on busy telephone	yes	yes	yes	yes
on busy line pool	yes	yes	yes	yes
ringing line preference	yes	yes	yes	yes
saved number redial	yes	yes	yes	yes
number of digits	16	24	24	24
selective line redirection	no	no	no	yes
set profile	yes	yes	yes	yes
speed dial:				
personal:	yes	yes	yes	yes
number of bins	24	24	24	24
number of digits	16	24	24	24
system:	yes	yes	yes	yes
number of bins	70	70	70	70
number of digits	16	24	24	24
tandem call routing	no	no	no	yes
telephone admin lock	no	yes	yes	yes
time/date display	yes	yes	yes	yes
transfer (with callback)				
immediate	yes	yes	yes	yes
using conference	yes	yes	yes	yes
using hold	yes	yes	yes	yes
with announcement	yes	yes	yes	yes
unsupervised conference	no	no	no	yes
user programmable feature buttons	yes	yes	yes	yes
voice call	yes	yes	yes	yes
voice call deny	yes	yes	yes	yes
volume control:				
handset	yes	yes	yes	yes
handsfree	yes	yes	yes	yes
headset	yes	yes	yes	yes
ringing	yes	yes	yes	yes
background music/page	yes	yes	yes	yes

FEATURE DESCRIPTIONS AND BENEFITS

DID Trunk Interface

This capability allows DID trunks to be connected to Norstar.

Benefit

DID trunks allow callers to bypass the attendant and directly reach a specific set. This provides the opportunity for better customer service and improved call handling/processing. In addition, due to its implementation via target lines, DID can be used for departmental access, with appearances of the same target line on many sets. This allows for concentration.

DISA

Modular DR4 software will enable DISA functionality with the installation of an E&M/DISA trunk cartridge or a DID trunk Cartridge. DISA will allow access to Norstar sets, Norstar paging, and Norstar outgoing lines. Access can be controlled via password.

Benefit

DISA extends the usefulness of a customer's Norstar system beyond the local office. It provides a mechanism which permits people away from the office to make use of Norstar facilities and features remotely, bypassing the normal tolls associated with using the public network.

E&M Trunk Interface

This capability allows E&M trunks to be connected to Norstar.

Benefit

Connectivity to other systems via E&M trunks allows Norstar to be an end node in a private network. This provides a cost effective solution to customers who do not require a larger sized system at all locations and also allows Norstars to be connected together to form a Norstar network.

Enhanced Restrictions

Enhanced restrictions encompass dialing filters and class of service. Dialing filters replace the restriction/override tables on previous Modular Software releases

(i) Dialing Filters

A dialing filter is a collection of dialing restrictions and exceptions. A dialing filter is applied as a unit to (1) one or more sets (set filter), (2) one or more lines (line filter), and/or (3) a line(s) on a particular set(s).

These filters limit what may be dialed out using these facilities; they also apply to incoming calls attempting to access these facilities. eg. a user remotely accessing a line will be subjected to the filter assigned to that line.

The system allows up to 100 dialing filters, with up to 400 individual entries. For example, if restriction "416" appears in 5 different filters, that uses up 5 of the possible 400 entries.

Only one filter can be assigned to a single facility (set or line or line/set)

Benefit

With the size of systems increasing, and the introduction of E&M trunks and DID trunks, it becomes too tedious and time consuming to apply restrictions and overrides individually. The use of filters simplifies the procedure conceptually and procedurally. In addition, because certain components of System Configuration and Administration have been re-arranged, the number of times an installer has to deal with each set and line in the system has been reduced.

In addition, the use of filters provides virtually unlimited flexibility in programming; each filter can be of any length,with exceptions limited to 48 per filter. A single filter may be applied to any number of sets, lines or line/set combinations.

(ii) Class of Service

Class of service permits controlled access to a system's resources.

A Class of Service defines:

a) the system facilities that a remote user may access (lines or line pools)
b) access to paging
c) the dialing restrictions, if any, that apply (dialing filters)

A Class of Service can be associated with a set, a line, or a COS password. A COS password is used when access to DISA is controlled via password.

Benefit

Class of service allows virtually unlimited bundling of system resources, with access strictly controlled via password. In this manner, a user's access to system resources can be restricted based on need/status. The use of Class of Service passwords also permits security of access to specific features e.g. DISA.

Flexible Call Park Prefix Digit

The call park prefix digit can be set to any digit from 0-9, or none. If "none" is selected, call park is disabled on the system.

A parked call will still have a 3 digit bin number assigned by the system.

Benefit

An administrable prefix code can be used to avoid conflicts with other features accessed via the numbering plan, such as line pool codes, and DNs. Inclusion of "none" allows for even greater flexibility when there are many conflicts with the numbering plan and the call park feature will not be used.

Flexible Direct Dial Digit

The system wide digit used to call a direct dial set can be programmed to be any digit from 0-9.

Benefit

This flexibility allows the direct dial digit to be tailored to the specific needs of the customer.

Increased Number of Line Pools

The number of line pools on Modular DR4 has been increased from 9 to 15.

Benefit

A greater number of line pools allows greater flexibility and opportunity to customize Norstar to meet the specific needs of the customer. It also provides the opportunity for sales into larger system sizes, where a greater number of line pools is needed.

Line Redirection

This feature allows a user to redirect incoming external calls to an external number. Using feature 84, the user will select the incoming line and the outgoing facility and program the digits to be dialed. All subsequent calls on that incoming line will be redirected via the outgoing facility to the designated external location. A ring splash can be programmed for any set with that line appearance, whereby a short burst of ringing will be heard whenever a call is redirected. A redirected call can not be picked up at a set with that line appearance. In order to be redirected, the incoming line must have disconnect supervision.

Any external number programmed will be subject to the dialing filters associated with the selected outgoing facility. That outgoing facility can be a specific line/trunk or a line pool.

Each line on a telephone can be redirected to a different external number.

Benefit

This feature allows the Norstar user to continue receiving calls at an alternate number, when he leaves the Norstar system. There are several benefits associated with this implementation:

(1) Only external calls are redirected, therefore "nuisance" intercom calls are avoided. eg. "Oh, I didn't know you were in a meeting with an important client."

(2) Each line can be redirected to a different location. eg. A private line given only to key customers would be redirected to your home, whereas "regular" calls would not.

(3) Because a separate outgoing facility can be specified for each line, different types of calls can be treated differently. eg. Information request calls on the "info line" can be redirected via E&M trunks to a head office staffed 24 hrs. per day for these types of calls; customer service/repair calls can be redirected to the repair person's home; etc.

Multiple Attendant (Direct Dial) Sets

On DR4, up to 5 attendant (direct dial) sets can be specified. A direct dial set operates as a "receptionist" set for a group of Norstar sets. Each Direct Dial set has the same properties as the Dial "0" set in Modular DR3; it can send up to 30 messages and can enable or disable ringing of Direct Dial calls to the Extra-Dial set for a service mode.

Benefit

This feature permits different groups of users to route their Direct Dial calls to different Direct Dial sets. This allows calls to be selectively routed to an individual that can handle these types of calls most appropriately. It can also be used to spread the load of Direct dial calls across several sets.

Unsupervised Conference

This feature allows a Norstar user to activate a conference call with two outside parties, exit from the conference call and allows the two external parties to remain connected, provided one of the calls was incoming. Both the incoming and outgoing facilities will remain busy until one of the two remaining parties disconnects. Should any long distance charges be incurred, the calling party is responsible for charges from his phone to the Norstar, and the Norstar user is responsible for charges from the Norstar to the other external party. One of the lines must be disconnect supervised.

Benefit

This feature allows the Norstar user to disconnect from a call which no longer requires his input, but still allows the two external parties to converse until the matter is resolved.

PROGRAMMING CHANGES

The following settings are new or have been enhanced for DR4:

A. Configuration

1. Trunk/Line Data (**new**)
    - Trunk Data (**new**)
        - Line (**new**)
        - Answer Mode (**new**)
        - Answer with DISA (**new**)
        - Signal (**new**)
        - Gain (**new**)
        - Dial Mode (moved from Line Data)
        - Full Autohold (moved from Line Data)
    - Line Data
        - Line Type
            - Pool (enhanced - now have 15 (vs 9) line pools, designated A-O (vs 1-9))

2. Line Access
    - Line Pool Access (enhanced - now have 15 pools vs 9)

3. Call Handling
    - Park Prefix (**new**)

4. Miscellaneous
    - Direct Dial # (**new**)
    - DISA DN (**new**)
    - Auto DN (**new**)
    - Line Pool Access Codes (enhanced - now have 15 pools vs 9)

5. System data (vs change DNs)
    - Rec'd number length (new)

B. General Admin

4. Direct Dial (**new**)
    - Set (**new**)
    - Name (**new**)

5. Capabilities (new - replaces 4. Restrictions)
    - Dialing Filters (**new**)
        - Filter Number (**new**)
            - Restrictions : (**new**)
                - # (**new**)
                - Restriction (**new**)
            - Exceptions: (**new**)
                - # (**new**)
                - Exception (**new**)
    - Remote Access Packages (**new**)
        - Package Number (**new**)
            - Line Pool Access (**new**)
            - Remote Page (**new**)

B. General Admin - (cont)

Set Abilities (**new**)
- Line (**new**)
- Line Filter (**new**)
- Remote Filter (**new**)
- Remote Package (**new**)

COS Passwords (**new**)
- Password Number (**new**)
  - Assigned to (**new**)
  - Password (**new**)
  - User Filter (**new**)
  - Line Filter (**new**)
  - Remote Package

Copy Record (enhanced to include line, set, and capabilities copy)

COMPATIBILITIES

COMPATIBILITIES

Peripheral Compatibility

TELEPHONE/PERIPHERAL	MODULAR DR2	MODULAR DR3	MODULAR DR4
M7100	X	√	√
M7208	√	√	√
M7310	√	√	√
M7324	√	√	√
CAP Module	√	√ (1)	√(1)
ATA	√	√	√
Enhanced ATA (DCI plastics)	√ (2)	√ (3)	√
DCI	√	√	√(4)
PCI-D	√	√	√
PCI-B	√	√	√
SMDR	√	√	√ (4)
SAPS	√	√	√
BLF	√	√	√

NOTES

1. Increased functionality

2. Same functionality as "old" ATA

3. Increased functionality on Release 5

   Increased functionality and improved performance on Release 6

4. Certain limitations apply, which are detailed in the attached product bulletin

Applications Compatibility

APPLICATION	MODULAR DR2	MODULAR DR3	MODULAR DR4
DBN - 2 + PCI-D	√	√	√
DBN - 2 + PCI-B	√	√	√
CDR - 2 + PCI-D	√	√	√ (1)
CDR - 2 + PCI-B	√	√	√ (1)
Hourglass 2 + PCI-D	√	√	√
Hourglass 2 + PCI-B	√	√	√
StarTalk	√	√ (2)	√ (3)

NOTES

1. Certain limitations apply, which are detailed in the attached product bulletin
2. Release 1.6 or higher
3. Release 2.0 or higher

Hardware/Software Compatibility

HARDWARE	MODULAR DR2	MODULAR DR3	MODULAR DR4
Release 1 KSU (disconnect supervision N/A)	√	√ (disc. sup. N/A)	√ (disc. sup. N/A)
Release 2 KSU	√ (disc. sup. N/A)	√	√
Release 1 Loop Start Trunk Cartridge (disconnect supervision N/A)	√	√	√
Release 2 Loop Start Trunk Cartridge	√ (disc. sup. N/A)	√	√
E&M Trunk Cartridge	X	X	√
DID Trunk Cartridge	X	X	√

UPGRADES

Modular DR2 to Modular DR4

This upgrade is a two step procedure. The software must first be upgraded from DR2 to DR3, and then DR3 to DR4. The customer data is all transferred from DR2 to DR4 except for Restrictions and Overrides. Because DR4 uses Dialing filters VS Restriction Tables, this information must be reprogrammed.

Modular DR3 to Modular DR4

This upgrade involves removing the DR3 Software Cartridge from the KSU, removing the DR3 ROM, and replacing it with a DR4 ROM. All customer data is transferred from the DR3 ROM to the DR4 ROM except for Restrictions and Overrides. Because DR4 uses Dialing filters VS Restriction Tables, this information must be reprogrammed.

MARKET POSITIONING
AND
TARGET MARKETS

MARKET POSITIONING AND TARGET MARKETS

Market Positioning

Norstar Modular DR4 software will be offered as an optional release to Modular to address the needs of businesses requiring Total Network Connectivity. This will give Norstar Modular DR4 the opportunity to compete more effectively in the Hybrid/Key market.

Benefits

Standardizing on Modular DR4 as an optional software offering will allow our distributors the opportunity to understand and train their personnel on the Modular DR4 platform. This will be the software platform that our Class/CMS project will be using and we will be bringing this project to Market in the '93 time-frame.

The enhanced feature functionality of Modular DR4 will be a benefit to some businesses over Modular DR3, with features such as:

1. Network Connectivity (Private & Public)
2. Network Access features (Selective Line Redirection/Unsupervised conference)
3. Totally Flexible Toll Restriction Configuration and Overrides called Dialing Filters (Sets, lines and line/set specific)
4. Multiple Attendant Sets
5. Flexible Numbering Plan Extensions

Target Markets

- Customers who require Network Connectivity (E&M Tie Line Trunking)
- Customers who require Public Network Connectivity
  - Direct Inward Dialing (DID)
  - Direct Inward System Access (DISA)
- Customers who require Network Access to features such as:
  - Selective Line Redirection (Type of External Call Forward)
  - Unsupervised Conference

These features require disconnect supervision to prevent held line conditions on Norstar

Note: Disconnect supervision is only available when a DR4 cartridge is installed in a RLS2 Modular KSU. For disconnect supervision on a system larger than 8x24 or with Networking capabilities, disconnect supervision loop start trunk cartridges AO366477/NT5B340GA or E&M trunk cartridges AO359618/NT5B38GA-93 or DID trunk cartridges AO359617/NT5B37GA-93 must also be used.

- For systems requiring enhanced feature functionality over and above DR3, DR4 gives them access to:
  - Enhanced Restriction Capabilities
    - applied to Norstar users
    - applied to Remote users (DISA, E&M)
  - Multiple Attendant Sets
  - Flexible Numbering Plan Extensions
    - Attendant Digit
    - Call Park Prefix Digit

ORDERING INFORMATION

Ordering Information

This section provides ordering information for Norstar Modular DR4 Software, documentation, and associated DR4 specific hardware (E&M/DISA trunk cartridge, DID trunk cartridge).

Cost

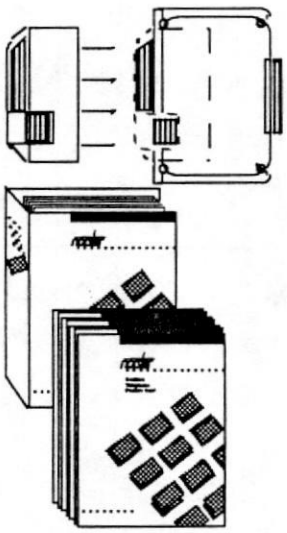
The NT CALA prices are shown belowon applicable offerrings

Modular DR4 English / French Software Package

Unit Price

A0387750 / NT5B25AO-93
(English Documentation)

A0387763 / NT5B25BD-93
(French Documentation)



Contains:

Two Part Software Cartridge

- **Modular DR4 Data Cartridge (ROM)**
  - **English / French**
- **NVRAM Cartridge**

Documentation

- **Modular DR4 System Coordinator Guide (complete with Binder)**

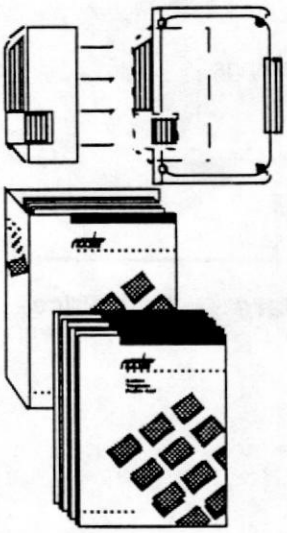
- **Modular DR4 Distribution Kit**
  - Modular DR4 Feature Card (Qty 24)
  - Modular DR4 Programming Record
  - Modular DR4 Central Answering Position User Card
  - Modular DR4 Prime Phone User Card
  - Modular DR4 Network Configuration Record
  - Modular DR4 Software Quick Reference

Modular DR4 English / Spanish Software Package

Unit Price

A0387764 / NT5B25DD-93
(English Documentation)

$575.00



Contains:

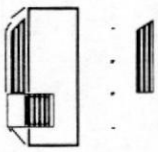
Two Part Software Cartridge
- **Modular DR4 Data Cartridge (ROM)**
  - **English / Spanish**
- **NVRAM Cartridge**

Documentation
- **Modular DR4 System Coordinator Guide (complete with Binder)**

- **Modular DR4 Distribution Kit**
  - Modular DR4 Feature Card (Qty 24)
  - Modular DR4 Programming Record
  - Modular DR4 Central Answering Position User Card
  - Modular DR4 Prime Phone User Card
  - Modular DR4 Network Configuration Record
  - Modular DR4 Software Quick Reference

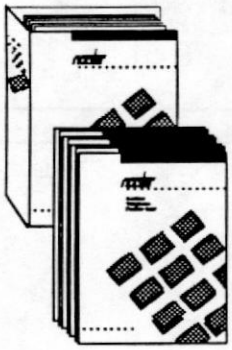
Modular DR4 English / French ROM Upgrade Kit (DOES NOT INCLUDE NVRAM)

Unit Price



A0393181 / NT6B9514
(English Documentation)

A0393180 / NT6B9513
(French Documentation)



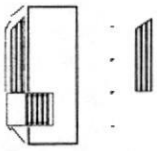
Contains:

- **Modular DR4 Data Cartridge (ROM) only**
  - **English / French**

**** N.B. Does NOT include NVRAM Cartridge****

Documentation
- **Modular DR4 System Coordinator Guide (complete with Binder)**

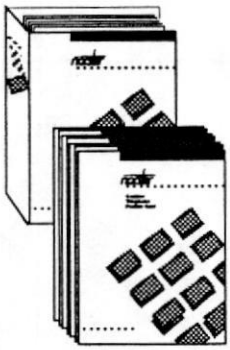
- **Modular DR4 Distribution Kit**
  - Modular DR4 Feature Card (Qty 24)
  - Modular DR4 Programming Record
  - Modular DR4 Central Answering Position User Card
  - Modular DR4 Prime Phone User Card
  - Modular DR4 Network Configuration Record
  - Modular DR4 Software Quick Reference



Modular DR4 English / Spanish ROM Upgrade Kit (DOES NOT INCLUDE NVRAM)

Unit Price

A0393182 / NT6B9515
(English Documentation)



Contains:

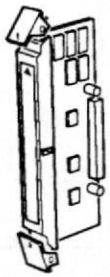
- **Modular DR4 Data Cartridge (ROM) only**
  - **English / Spanish**

**** N.B. Does NOT include NVRAM Cartridge ****

Documentation

- **Modular DR4 System Coordinator Guide (complete with Binder)**

- **Modular DR4 Distribution Kit**
  - Modular DR4 Feature Card (Qty 24)
  - Modular DR4 Programming Record
  - Modular DR4 Central Answering Position User Card
  - Modular DR4 Prime Phone User Card
  - Modular DR4 Network Configuration Record
  - Modular DR4 Software Quick Reference



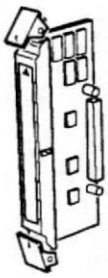
Norstar E&M/DISA Trunk Cartridge

Unit Price

A0359618/ NT5B38GA-93

Contains: one (1) E&M/DISA Trunk Cartridge
- Supports two (2) E&M trunks
- Provides two (2) DTMF receivers for DISA

$500.00



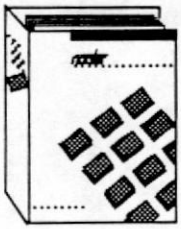
Norstar DID Trunk Cartridge

Unit Price

A0359617/ NT5B37GA-93

Contains: one (1) DID Trunk Cartridge
- Supports Four (4) DID trunks

$550.00



Norstar Modular DR4 System Coordinator Guide

A0387755/ NT6B9646 (English)

A0387757 / NT6B9648 (French)

Contains:

- **one (1) System Coordinator Guide (binder included)**

Norstar Modular DR4 Distribution Kit

A0387756 / NT6B9647 (English)

A0387758/ NT6B9649 (French)

Contains:

- Modular DR4 Feature Card(24)
- Modular DR4 Programming Record
- Modular DR4 Central Answering Pos. User Card
- Modular DR4 Prime Phone User Card
- Modular DR4 Network Configuration Record
- Modular DR4 Software Quick Reference

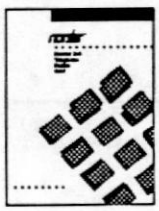
Norstar Modular DR4 Installer Guide

A0389272 / NT6B9664 (English)

A0389273 / NT6B9665 (French)

Contains:

- **one (1) Installer Guide (binder included)**



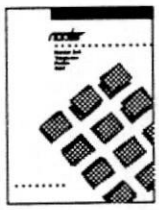
Norstar Modular DR4 Programming Record

P0728522 (English)

P0728523 (French)

Contains:

- **one (1) Programming Record**



Norstar Modular DR4 Central Answering Position User Card

P0728520 (English)

P0728521 (French)

Contains:

- one (1) CAP User Card

Norstar Modular DR4 Prime Telephone User Card

P0728526 (English)

P0728527 (French)

Contains:

- one (1) Prime Telephone User Card

Norstar Modular DR4 Feature Card

P0728518 (English)

P0728519 (French)

Contains:

- one (1) Feature Card

Norstar Modular DR4 Network Configuration Record

P0728524 (English)

P0728525 (French)

Contains:

- one (1) Network Configuration Record

Norstar Modular DR4 Software Quick Reference

P0728528 (English)

P0728529 (French)

Contains:

- one (1) Software Quick Reference

Ordering Information

Northern Telecom (CALA) Corporation
P.O. Box 5070
14645 NW 77th Ave
Miami Lakes, FL U.S.A.
33014-2559
((305) 526-8400

DOCUMENTATION

DOCUMENTATION

Content

Documentation for Norstar Modular DR4 follows the same format introduced with Modular DR3.

The DR4 documentation suite consists of the following:

A. In-box (KSU) documentation

- Hardware installation quick reference

B. In-box (software) documentation

i) System Coordinator Kit (SCG kit)

- binder spine
- table of modules
- modules:
  - Introduction to Norstar
  - Components
  - Introduction to programming (includes programming overlay)
  - Administration
  - Telephone features
  - Telephone user cards
  - Glossary
  - Index
- binder
- set of dividers

ii) Distribution Kit

- DR4 Feature Cards (24)
- Central Answering Position User Card
- Prime Telephone User Card
- Modular DR4 Programming Record
- Network Configuration Record
- DR4 software quick reference

C. Additional Documentation (Optional)

- Installer Guide
- binder spine insert
- table of modules
- modules:
  - Planning a network with Norstar
  - Components
  - Introduction to programming (includes programming overlay)
  - Startup
  - Configuration
  - Administration
  - Maintenance session
  - Hardware upgrades
  - Troubleshooting
  - Network troubleshooting
  - Telephone features
  - Telephone user cards
  - Technical data
  - Glossary
  - Index
- binder
- set of dividers

Descriptions

Hardware Installation Quick Reference

This document outlines the procedures for hardware installation. It is not software specific.

System Coordinator Guide Kit

This document provides all information required by the system coordinator to customize Norstar features for the business's unique needs, after the installer has left. It also services as a reference document with answers to the the questions asked most frequently after the initial installation.

DR4 Feature Card

This card gives a complete, software specific feature list including descriptions and generalized procedures for using and programming features.

CAP User Card

This card explains what a CAP module is, how to program it, and how to answer/transfer/monitor calls.

Prime Telephone User Card

This card explains: (1) the role of a prime set; (2) when/how to answer multiple calls at once; (3) the options for handling calls and (4) display messages for redirected Norstar calls.

Programming Record

This document serves as a guide to programming Norstar Modular and as an on-site permanent record of what was programmed.

DR4 Network Configuration Record

The network configuration record summarizes the characteristics required on the trunks supplied at the far end of the Norstar-to-Network connection.

DR4 Software Quick Reference

This document includes all software specific information required for installing Norstar hardware e.g. wiring diagrams for E&M/DISA and DID trunk cartridges.

Installer Guide

The installer guide is a reference document for installers.

MARKETING AND INTRODUCTION SUPPORT

MARKETING AND INTRODUCTION SUPPORT

Market Support

1. A Sales and Marketing Bulletin is included in this package

2. A Modular DR4 Overhead Presentation with presentation notes is included in this Package

2 A Technical Training Course is included with this document and includes information on:
   - Terminology
   - Hardware Components
   - Configuration Programming
   - Administration Programming
   - Feature Operation
   - Troubleshooting

3. Promotional Material - A DR4 brochure insert to existing DR3 brochure is available
   - Features and benefits update to include DR4 functionality

TRAINING

TRAINING

Technical Training

This course will be a continuation of the existing Modular DR2 and DR3 Installation courses. It will consist of the following sections:

- Overview of Modular DR4 and networks
- Installation
- Programming
- Feature Operation
- Troubleshooting

The training course for modular DR4 is included in this package

Target Audience

The audience for the Modular DR4 technical training consists of:

- Installers
- Repair personnel
- Service advisors

The Installer is anyone who installs, programs, and uses Norstar Modular.

The Repair person's function is similar to that of the installer. In addition to the tasks performed by the installer, the repair person must also be able to identify and solve potential problems arising with Norstar. They are assumed to have the same level of experience as the installer.

The Service advisor is the person usually sent to train the End User on programming and using Norstar.

Objectives

Installer

Upon completion of the course, the installer will be able to successfully install and program Norstar DR4, as well as use the new features. In addition, the student will also have a good understanding of how Norstar fits into an overall networked environment.

Repair Person

Upon completion of the course, the repair person will understand the installation and programming of Norstar DR4, as well as understand the new features (what they are, how they work, how to access them). The repair person will also understand the relationship between Norstar DR4 and the system with which it is networked, and have the tools to successfully troubleshoot a trouble site.

Service Advisor

The service advisor will understand Norstar DR4 Administration programming, operation of the new features, and be able to use and demonstrate the new features.

Materials

The course material developed includes:

- self paced student workbook
- leader's guide
- participant's guide
- sample programming record
- student quizes

Duration

The time required to complete the course is dependent on the methodology and the experience level of the participant. However, it is anticipated that the Installers and repair personnel will require 9 hours, and the service advisor will require 4. 5 hours , to complete the required sections of the course.

Sales Training

DR4 sales training is a "stand alone" modular package . The package consists of the following sections :

- Historical overview
- Product description, positioning, sales strategy, competition
- Product demonstration guide/end user presentation material and Request for Proposal (RFP) information
- Configuration and applications
- Network terms and definitions

The course is leader led and will be available in English and French.

Target Audience

The audience for Modular DR4 sales training is sales and sales related personnel who require an understanding of Modula DR4 features and applications.

Objectives

The objective of the sales training package is to provide sales a nd sales related personnel with the tools necessary to successfully sell Modular DR4; from understanding applications to demonstrating DR4 solutions to the end customer.

Materials

The sales training package is a stand alone document which can be used in a facilitated event (leader led training) or as a self paced learning document.

The sales training package will be available to Channels on Macintosh diskettes, as well as a paper master from which each Channel can reproduce material for its own needs.

Duration

The time required to complete the course is dependent upon the methodology and the experience level of the participants. If the package is used in a facilitated event, with participants who are not familiar with networks, the time required to complete the course is estimated at four (4) hours. If it is being used in a self paced format, by a person who has network experience, it is anticipated that one and one half (1.5) hours will be sufficient.

CONTACT LIST

northern telecom

norstar

MN-MB-030

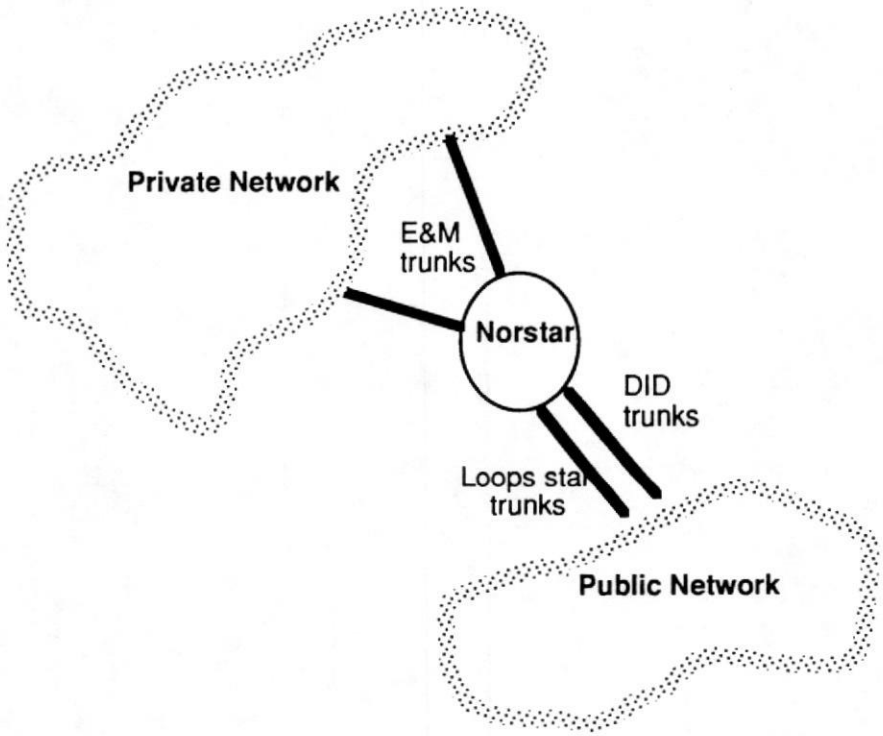
Sales and Marketing Bulletin November 1991

Norstar Modular Design Release 4

Description

Norstar Modular Design Release 4 is a new software release for new and installed Norstar Modular systems. It was designed to allow Norstar to be part of a private or public network. Norstar can be connected to an existing private network, or to other Norstar systems to form a Norstar Network. Several new capabilities and features are added in DR4 to support networking and larger systems. These include:

- E&M trunking for private network connectivity
- Direct Inward System Access (DISA) for external access to the private network
- Direct Inward Dialing (DID) for public access to specific Norstar users
- Enhanced Restriction Capabilities
  - Dialing Filters
  - Class of Service
- Selective Line Redirection
- Unsupervised Conference
- Multiple Attendant (Direct-Dial) Sets
- Increased Number of Line Pools
- Flexible Numbering Plan
  - Direct-Dial Digit
  - Call Park Prefix Digit



Feature Descriptions and Benefits

DID Trunk Interface

This capability allows DID trunks to be connected to Norstar.

Benefit

DID trunks allow callers to bypass the attendant and directly reach a specific set. This provides the opportunity for better customer service and improved call handling/processing. In addition, due to its implementation via target lines, DID can be used for departmental access, with appearances of the same target line on many sets. This allows for concentration.

DISA

Direct Inward System Access (DISA) is a term used by Norstar to define a security feature which may be used to control remote access to the Norstar system. Remote access allows users elsewhere on the public or private network to call into Norstar and once into the system gain access to a subset of the system's resources.

Benefit

The remote access feature permits people away from the office to make use of Norstar's private or public network facilities remotely to bypass the normal toll costs associated with using the public network. The DISA password is a six digit password.

E&M Trunk Interface Type II

This capability allows E&M trunks to be connected to Norstar.

Benefit

Connectivity to other systems via E&M trunks allows Norstar to be an end node in a private network. This provides a cost effective solution to customers who do not require a larger sized system at all locations and also allows Norstars to be connected together to form a Norstar network. We do not recommend using ATA's to connect one Norstar system to another as there is a 3.0dB loss in the transmit path per Key Service Unit (KSU) connected.

Enhanced Restrictions

Enhanced restrictions encompass dialing filters and class of service. Dialing filters replace the restriction/override tables on previous Modular Software releases

(i) Dialing Filters

A dialing filter is a collection of dialing restrictions and exceptions. A dialing filter is applied as a unit to (a) one or more sets (set filter), (b) one or more lines (line filter), and/or (c) a line(s) on a particular set(s).

These filters limit what may be dialed out using these facilities; they also apply to incoming calls attempting to access these facilities. eg. a user remotely accessing a line will be subjected to the filter assigned to that line.

The system allows up to 100 dialing filters, with up to 400 individual entries. For example, if restriction "416" appears in 5 different filters, that uses up 5 of the possible 400 entries.

Only one filter can be assigned to a single facility (set or line or line/set)

Benefit

With the size of systems increasing, and the introduction of E&M trunks and DID trunks, it becomes too tedious and time consuming to apply restrictions and overrides individually. The use of filters simplifies the procedure conceptually and procedurally. In addition, because certain components of System Configuration and Administration have been re-arranged, the number of times an installer has to deal with each set and line in the system has been reduced.

In addition, the use of filters provides virtually unlimited flexibility in programming; each filter can be of any length,with exceptions limited to 48 per filter. A single filter may be applied to any number of sets, lines or line/set combinations.

(ii) Class of Service

Class of service permits controlled access to a system's resources.

A Class of Service defines:

a) the system facilities that a remote user may access (lines or line pools)
b) access to paging remotely
c) the dialing restrictions, if any, that apply (dialing filters)

A Class of Service can be associated with a set, a line, or a COS password. A COS password isused when access to DISA is controlled via password.

Benefit

Class of service allows virtually unlimited bundling of system resources, with access strictly controlled via password. In this manner, a user's access to system resources can be restricted based on need/status. The use of Class of Service passwords also permits security of access to specific features e.g. DISA.

Flexible Call Park Prefix Digit

The call park prefix digit can be set to any digit from 0-9, or none. If "none" is selected, call park is disabled on the system.

A parked call will still have a 3 digit bin number assigned by the system.

Benefit

An administrable prefix code can be used to avoid conflicts with other features accessed via the numbering plan, such as line pool codes, and DNs. Inclusion of "none" allows for even greater flexibility when there are many conflicts with the numbering plan and the call park feature will not be used.

Flexible Direct Dial Digit

The system wide digit used to call a direct dial set can be programmed to be any digit from 0-9.

Benefit

This flexibility allows the direct dial digit to be tailored to the specific needs of the customer.

Increased Number of Line Pools

The number of line pools on Modular DR4 has been increased from 9 to 15.

Benefit

A greater number of line pools allows greater flexibility and opportunity to customize Norstar to meet the specific needs of the customer. It also provides the opportunity for sales into larger system sizes, where a greater number of line pools is needed, particularly E&M.

Line Redirection

This feature allows a user to redirect incoming external calls to an external number. Using feature 84, the user will select the incoming line and the outgoing facility and program the digits to be dialed. All subsequent calls on that incoming line will be redirected via the outgoing facility to the designated external location. A ring splash can be programmed for any set with that line appearance, whereby a short burst of ringing will be heard whenever a call is redirected. A redirected call can not be picked up at a set with that line appearance. In order to be redirected, the incoming line must have disconnect supervision. The set that redirected the line may also (using button inquiry feature*0) "drop" the call in progress.

Any external number programmed will be subject to the dialing filters associated with the selected outgoing facility. That outgoing facility can be a specific line/trunk or a line pool.

Each line on a telephone can be redirected to a different external number.

Benefit

This feature allows the Norstar user to continue receiving calls at an alternate number, when he leaves the Norstar system. There are several benefits associated with this implementation:

(1) Only external calls are redirected, therefore "nuisance" intercom calls are avoided. eg."Oh, I didn't know you were in a meeting with an important client."
(2) Each line can be redirected to a different location. eg. A private line given only to key customers would be redirected to your home, and other calls would not.
(3) Because a separate outgoing facility can be specified for each line, different types of calls can be treated differently. eg. Information request calls on the "info line" can be redirected via E&M trunks to a head office staffed 24 hrs. per day for these types of calls; customer service/repair calls can be redirected to the repair person's home; etc.

Multiple Attendant (Direct Dial) Sets

On DR4, up to 5 attendant (direct dial) sets can be specified. A direct dial set operates as a "receptionist" set for a group of Norstar sets. Each Direct Dial set has the same properties as the Dial "0" set in Modular DR3; it can send up to 30 messages and can enable or disable ringing of Direct Dial calls to the Extra-Dial set for a service mode.

Benefit

This feature permits different groups of users to route their Direct Dial calls to different Direct Dial sets. This allows calls to be selectively routed to an individual that can handle these types of calls most appropriately. It can also be used to spread the load of Direct dial calls across several sets.

Unsupervised Conference

This feature allows a Norstar user to activate a conference call with two outside parties, exit from the conference call and allows the two external parties to remain connected, provided one of the calls was incoming. Both the incoming and outgoing facilities will remain busy until one of the two remaining parties disconnects. Should any long distance charges be incurred, the calling party is responsible for charges from his phone to the Norstar, and the Norstar user is responsible for charges from the Norstar to the other external party. One of the lines must be disconnect supervised.

Benefit

This feature allows the Norstar user to disconnect from a call which no longer requires his input, but still allows the two external parties to converse until the matter is resolved.

Compatibilities

Peripheral Compatibility

TELEPHONE/PERIPHERAL	MODULAR DR2	MODULAR DR3	MODULAR DR4
M7100	X	√	√
M7208	√	√	√
M7310	√	√	√
M7324	√	√	√
CAP Module	√	√ (1)	√ (1)
ATA	√	√	√
Enhanced ATA (DCI plastics)	√ (2)	√ (3)	√
DCI	√	√	√ (4)
PCI-D	√	√	√
PCI-B	√	√	√
SMDR	√	√	√ (4)
SAPS	√	√	√
BLF	√	√	√

NOTES

1. Increased functionality
2. Same functionality as "old" ATA
3. Increased functionality on Release 06
4. Certain limitations apply, see applications/peripheral compatibility

Applications Compatibility

APPLICATION	MODULAR DR2	MODULAR DR3	MODULAR DR4
DBN - 2 + PCI-D	√	√	√ (1)
DBN - 2 + PCI-B	√	√	√ (1)
CDR - 2 + PCI-D	√	√	√ (1)
CDR - 2 + PCI-B	√	√	√ (1)
Hourglass 2 + PCI-D	√	√	√
Hourglass 2 + PCI-B	√	√	√
StarTalk	√	√ (2)	√ (3)

See following notes

NOTES

1. Certain limitations apply, see applications/peripheral compatibility
2. Release 1.6 or higher
3. Release 2.0 or higher

Applications/Peripheral Compatibility

Hourglass and Professional Organizer are compatible with DR4 software.

CDR, Call Accounting, SMDR, DCI will be upgraded in the near future as they do not currently support the new DR4 functionality (target lines are not recognized). Dial-by-Name is limited in its' functionality as it does not recognize line pools 9-15 which were introduced in DR4.

Hardware/Software Compatibility

HARDWARE	MODULAR DR2	MODULAR DR3	MODULAR DR4
Release 1 KSU (disconnect supervision N/A)	√	√ (disc. sup. N/A)	√ (disc. sup. N/A)
Release 2 KSU	√ (disc. sup. N/A)	√	√
Release 1 Loop Start Trunk Cartridge (disconnect supervision N/A)	√	√	√
Release 2 Loop Start Trunk Cartridge	√ (disc. sup. N/A)	√	√
E&M Trunk Cartridge	X	X	√
DID Trunk Cartridge	X	X	√

Upgrades

Modular DR2 to Modular DR4

This upgrade is a two step procedure. The software must first be upgraded from DR2 to DR3, and then DR3 to DR4. The customer data is all transferred from DR2 to DR4 except for Restrictions and Overrides. Because DR4 uses Dialing filters VS Restriction Tables, this information must be reprogrammed.

Modular DR3 to Modular DR4

This upgrade involves removing the DR3 Software Cartridge from the KSU, removing the DR3 ROM, and replacing it with a DR4 ROM. All customer data is transferred from the DR3 ROM to the DR4 ROM except for Restrictions and Overrides. Because DR4 uses Dialing filters vs Restriction Tables, this information must be reprogrammed.

Availability

Modular design release 4, E&M/DISA T/C, DID T/C availability November 1991.

Warranty

The Norstar Modular Design Release 4, E&M/DISA T/C, DID T/C have an 18 month warranty from date of manufacture.

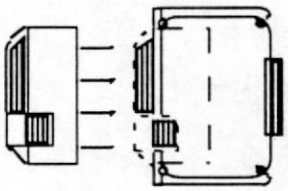
Factory Authorized Repair Location:

Northern Telecom Canada Ltd.
Telecom Services Division
12345 Albert Hudson Blvd.
Montreal, North, Quebec
H1G 3L1

Mean Time Between Failures

DR4 Software Cartridge	
ROM	150 years
NVRAM	121 years
Complete Cartridge (ROM & NVRAM)	67 years
E&M/DISA T/C	91 years
DID T/C	73 years

Modular DR4 English / French Software Package

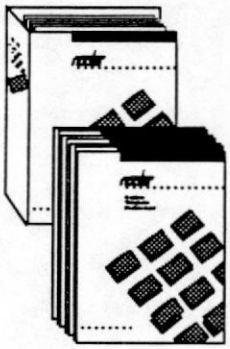


A0387750 / NT5B25AO-93
(English Documentation)

A0387763 / NT5B25BD-93
(French Documentation)

Contains:

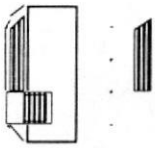
Two Part Software Cartridge
- **Modular DR4 Data Cartridge (ROM)**
  - **English / French**
- **NVRAM Cartridge**



Documentation
- **Modular DR4 System Coordinator Guide (complete with Binder)**

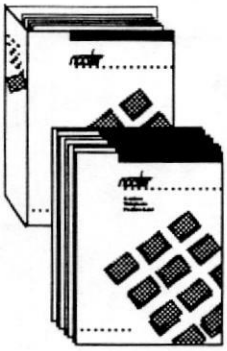
- **Modular DR4 Distribution Kit**
  - Modular DR4 Feature Card (Qty 24)
  - Modular DR4 Programming Record
  - Modular DR4 Central Answering Position User Card
  - Modular DR4 Prime Phone User Card
  - Modular DR4 Network Configuration Record
  - Modular DR4 Software Quick Reference

Modular DR4 English / French ROM Upgrade Kit
(DOES NOT INCLUDE NVRAM)



A0393181 / NT6B9514
(English Documentation)

A0393180 / NT6B9513
(French Documentation)



Contains:

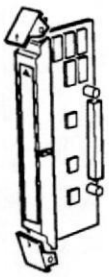
- **Modular DR4 Data Cartridge (ROM) only**
  - **English / French**

**** N.B. Does NOT include NVRAM Cartridge****

Documentation

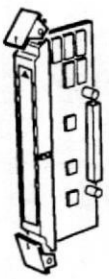
- **Modular DR4 System Coordinator Guide (complete with Binder)**

- **Modular DR4 Distribution Kit**
  - Modular DR4 Feature Card (Qty 24)
  - Modular DR4 Programming Record
  - Modular DR4 Central Answering Position User Card
  - Modular DR4 Prime Phone User Card
  - Modular DR4 Network Configuration Record
  - Modular DR4 Software Quick Reference



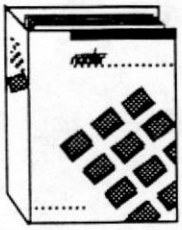
Norstar E&M/DISA
Trunk Cartridge
A0359618/ NT5B38GA-93

Contains: one (1) E&M/DISA Trunk Cartridge
- Supports two (2) E&M trunks
- Provides two (2) DTMF receivers for DISA



Norstar DID
Trunk Cartridge
A0359617/ NT5B37GA-93

Contains: one (1) DID Trunk Cartridge
- Supports Four (4) DID trunks



Norstar Modular DR4 System Coordinator Guide

A0387755/ NT6B9646 (English)

A0387757 / NT6B9648 (French)

Contains:

- **one (1) System Coordinator Guide (binder included)**

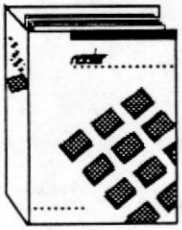
Norstar Modular DR4 Distribution Kit

A0387756 / NT6B9647 (English)

A0387758/ NT6B9649 (French)

Contains:

- Modular DR4 Feature Card(24)
- Modular DR4 Programming Record
- Modular DR4 Central Answering Pos. User Card
- Modular DR4 Prime Phone User Card
- Modular DR4 Network Configuration Record
- Modular DR4 Software Quick Reference



Norstar Modular DR4 Installer Guide

A0389272 / NT6B9664 (English)

A0389273 / NT6B9665 (French)

Contains:

- **one (1) Installer Guide (binder included)**

Norstar Modular DR4 Programming Record

P0728522 (English)

P0728523 (French)

Contains:

- **one (1) Programming Record**

Norstar Modular DR4 Central Answering Position User Card

P0728520 (English)

P0728521 (French)

Contains:

- **one (1) CAP User Card**

Norstar Modular DR4 Prime Telephone User Card

P0728526 (English)

P0728527 (French)

Contains:

- **one (1) Prime Telephone User Card**

Norstar Modular DR4 Feature Card

P0728518 (English)

P0728519 (French)

Contains:

- **one (1) Feature Card**

Norstar Modular DR4 Network Configuration Record

P0728524 (English)

P0728525 (French)

Contains:

- **one (1) Network Configuration Record**

Norstar Modular DR4 Software Quick Reference

P0728528 (English)

P0728529 (French)

Contains:

- **one (1) Software Quick Reference**

Ordering Information

Northern Telecom (CALA) Corporation
P.O. Box 5070
14645 NW 77th Ave.
Miami Lakes, FL
33014-2559 U.S.A.
(305) 526-8400

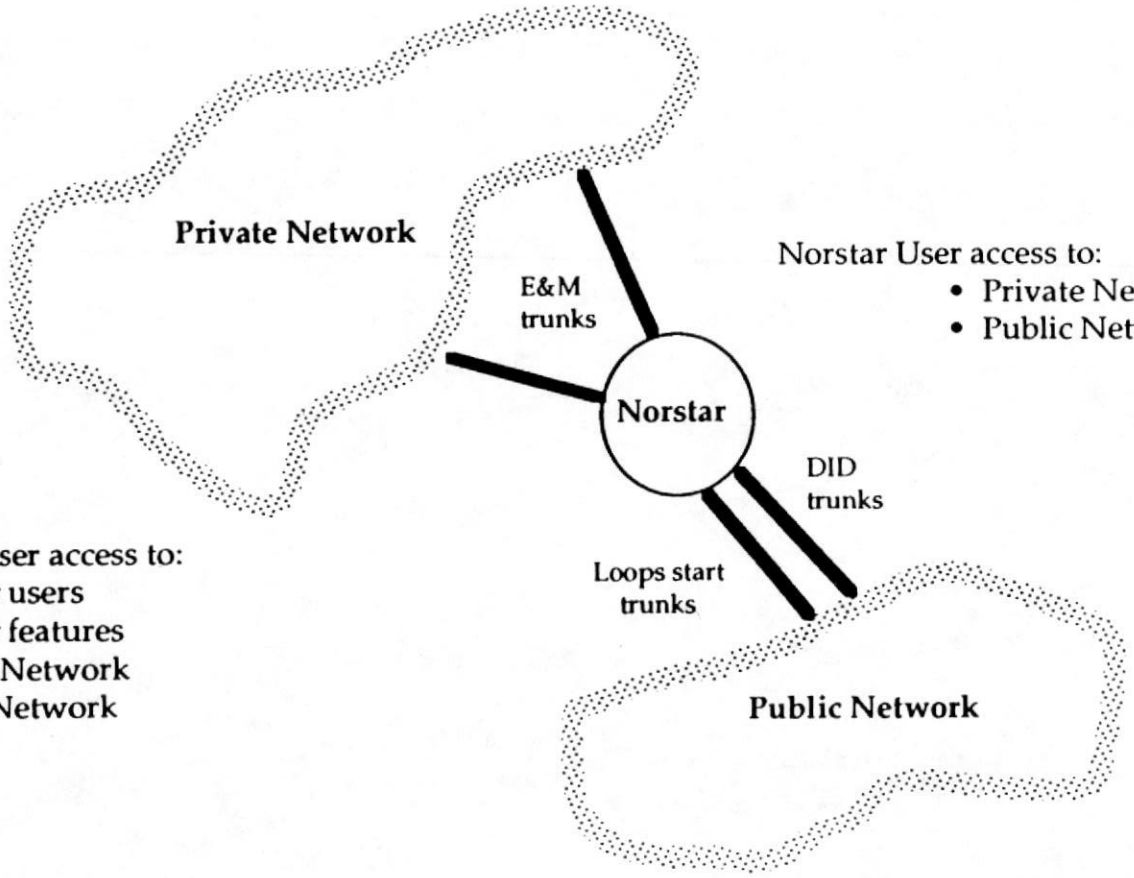
norstar

MODULAR DR4
OVERHEAD PRESENTATION
&
PRESENTATION NOTES

November 1991
NT CALA Corp.

DR4 Networking

CONTENT:
DR4 Software cartridge
E&M Trunk cartridge
DID Trunk Cartridge



Norstar User access to:
- Private Network
- Public Network

Private Network user access to:
- Norstar users
- Norstar features
- Private Network
- Public Network

Public Network user access to:
- Norstar users
- Norstar features
- Private Network
- Public Network

DR4 New Content

Private Network Connectivity

- E&M trunking

Public Network Connectivity

- Direct Inward Dialing
- Direct Inward System Access

Enhanced Restriction Capabilities

- applied to Norstar users
- applied to Remote users (DISA, E&M)

Network Access Features

- Selective Line Redirection
- Unsupervised Conference

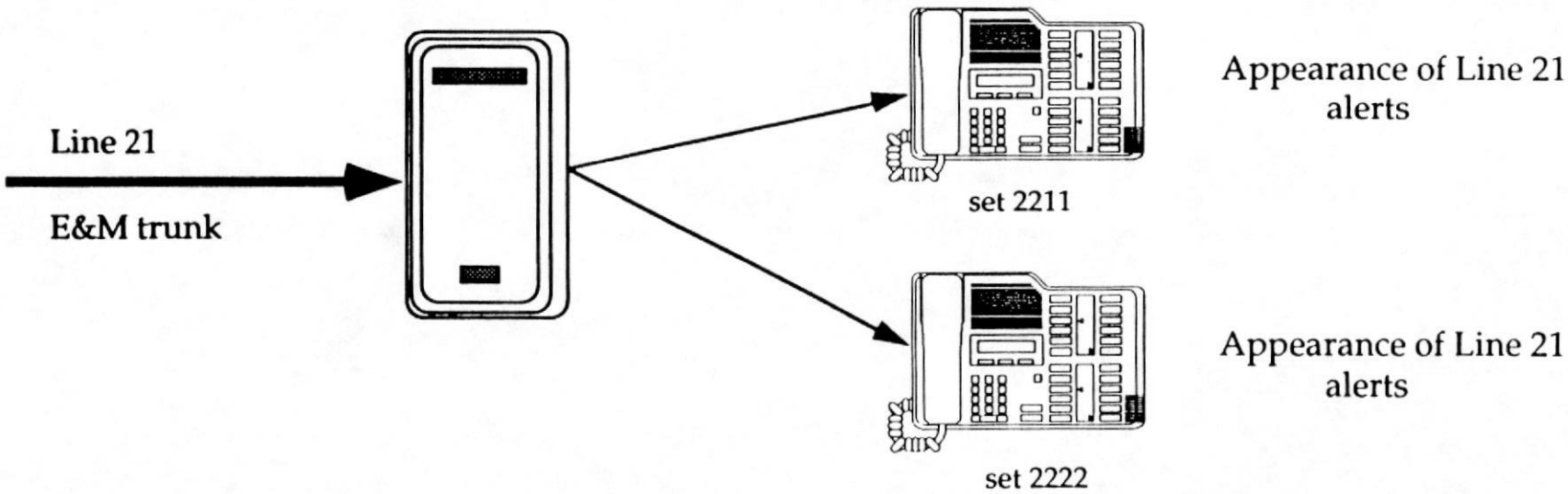
Multiple Attendant Sets

Flexible Numbering Plan Extensions

- Attendant Digit
- Call Park Prefix Digit

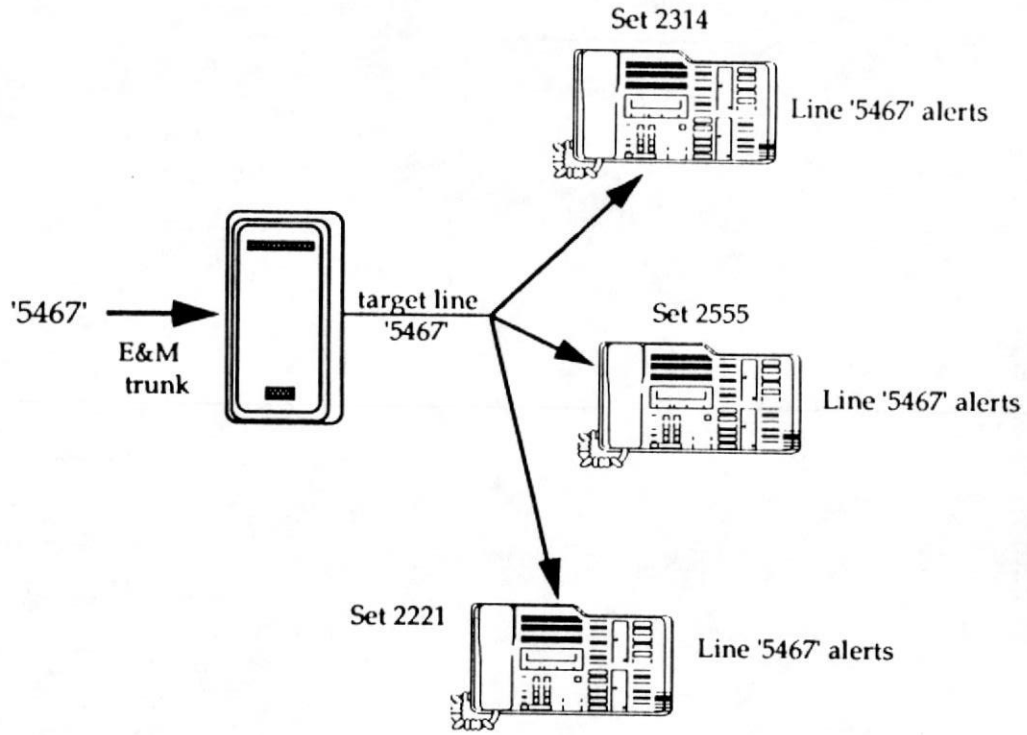
Manual Answer E&M Trunk

- provides E&M trunk appearance in a standard key system configuration



Auto-Answer E&M Trunk

Remote Access to Sets:

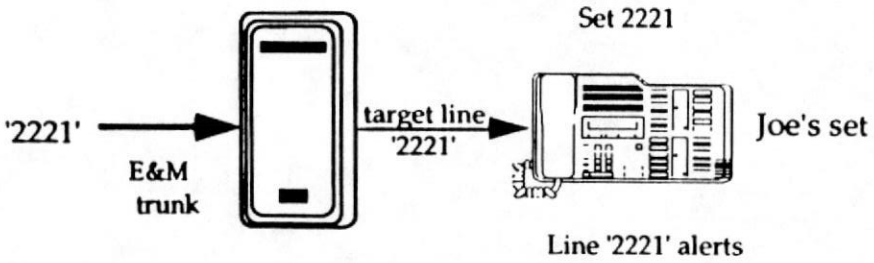


caller dials 5467 to reach parts dept

Line Concentration

Attendant Bypass

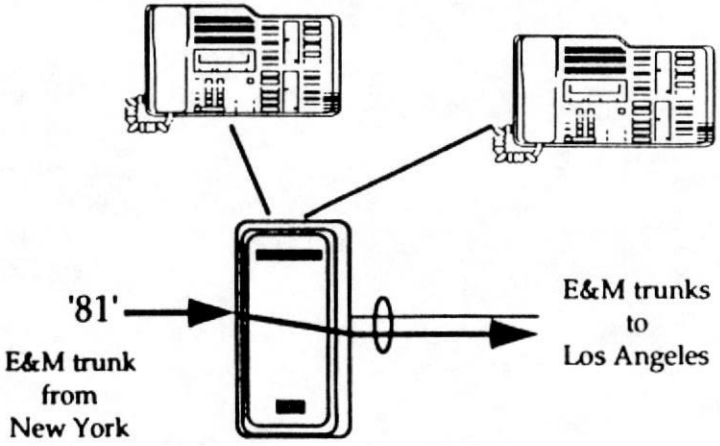
caller dials 2221 to reach Joe



Auto-Answer E&M Trunk

Remote Tandem Access:

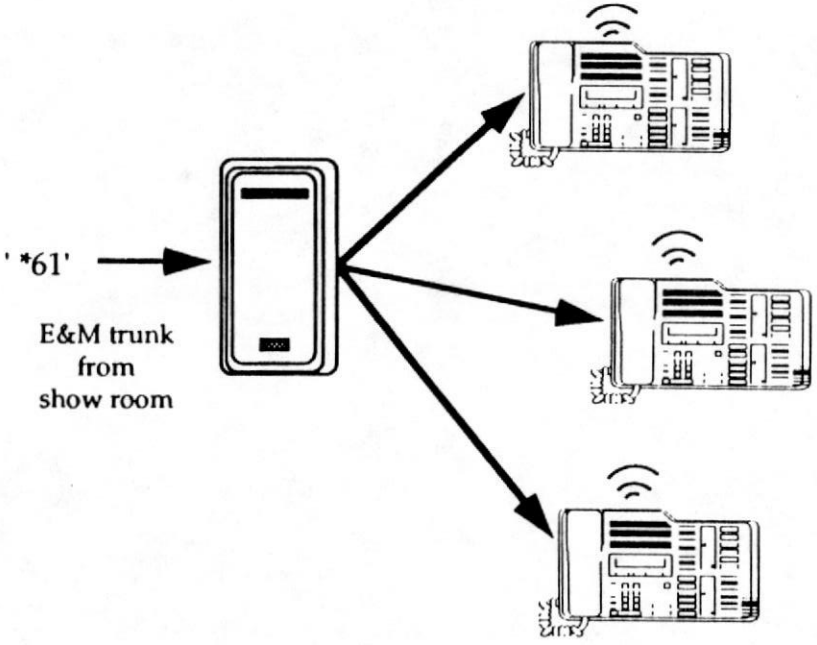
Betty in the east coast branch office dials 81 to get a line to the west coast branch office



main office in Chicago

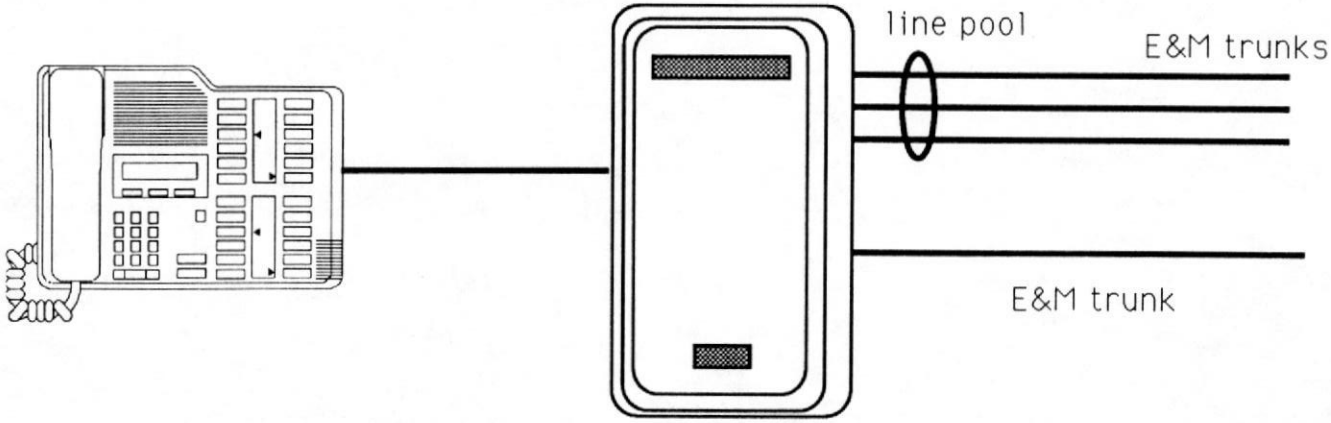
Remote Paging Access:

Roger in show room calls automotive shop to page Joe



E&M Trunks - Outgoing

- provides Norstar user with access to the private network



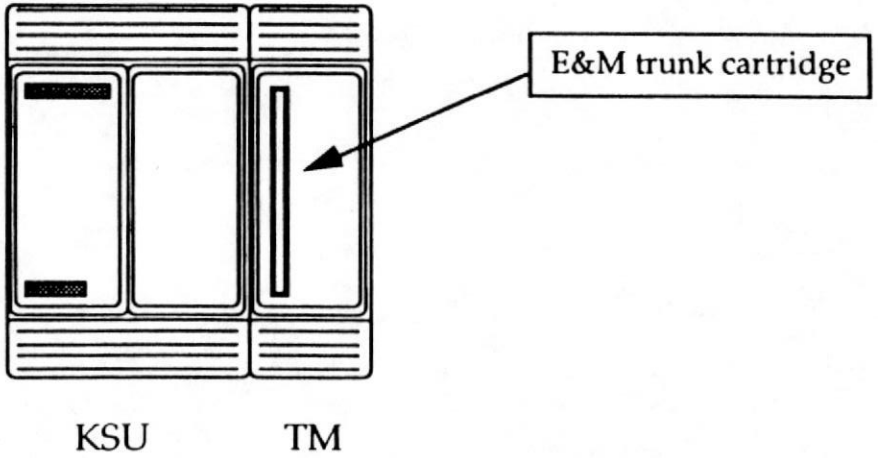
E & M TRUNKS - Incoming

- provides private network user with
  - * Remote access to Norstar Sets
  - * Remote Acess to selected Norstar features
  - * Remote Tandem Acess to public and private networks
- extends existing Norstar call coverage features to incoming calls on E & M trunks

E&M Trunks

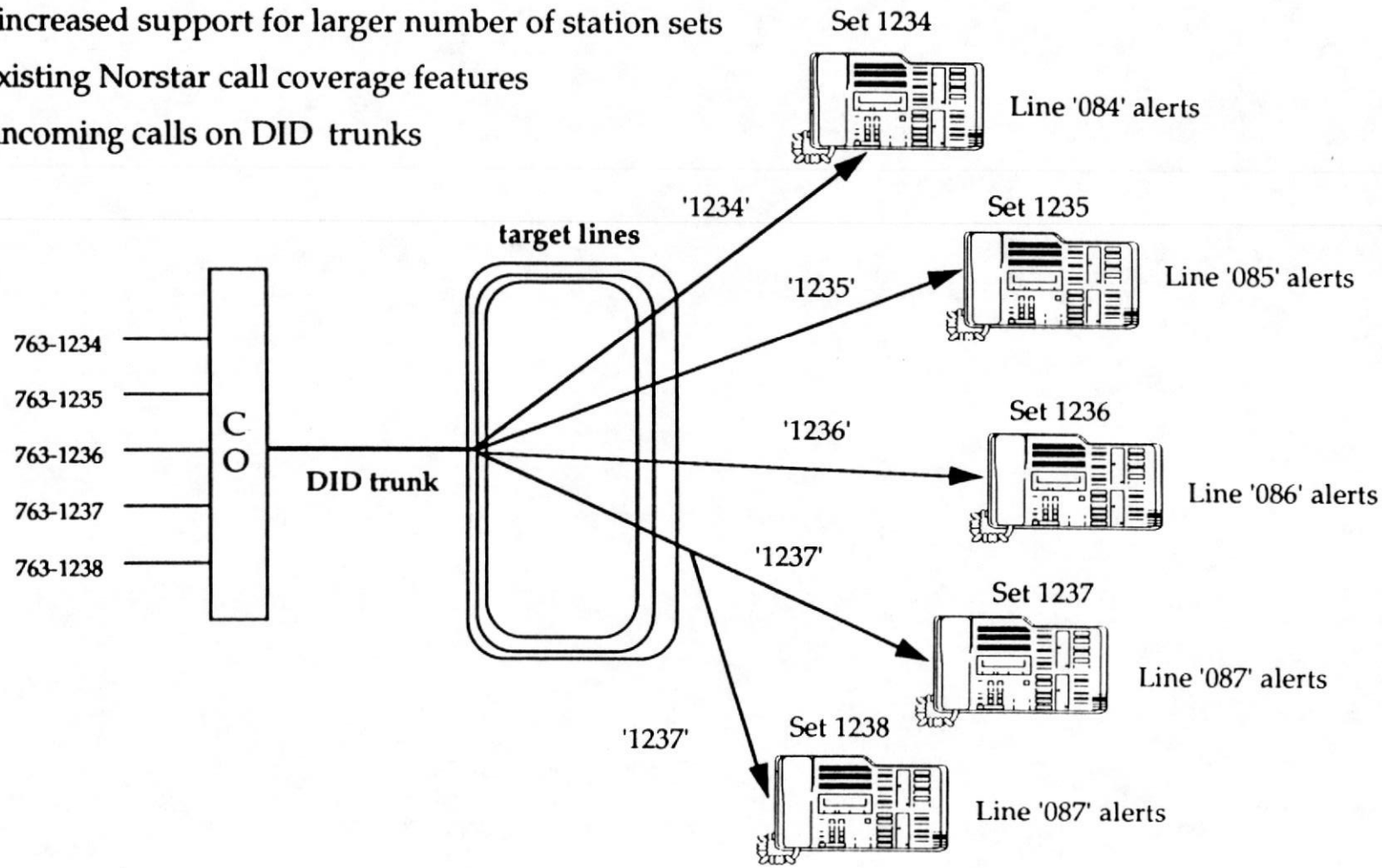
Hardward Configuration

- requires **E&M/DISA trunk cartridge** which provides 2 E&M trunk circuits



Direct Inward Dialing

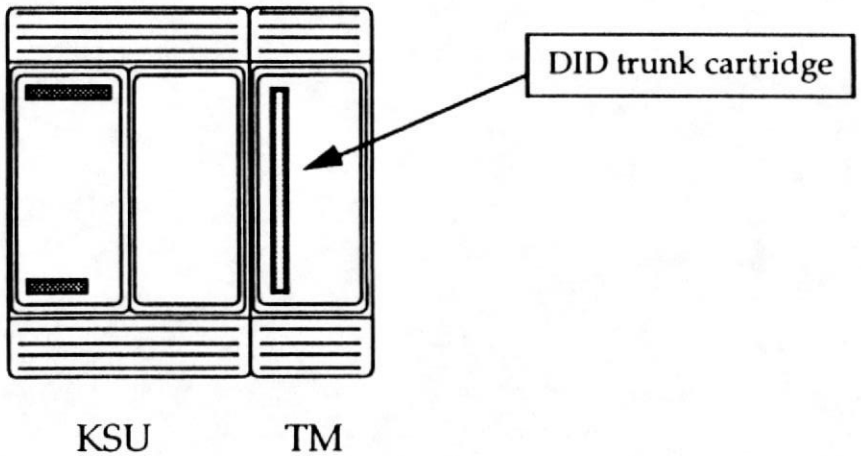
- provides public network access to station sets
- provides attendant by-pass
- provides increased support for larger number of station sets
- extends existing Norstar call coverage features to incoming calls on DID trunks



DID Trunks

Hardware Configuration

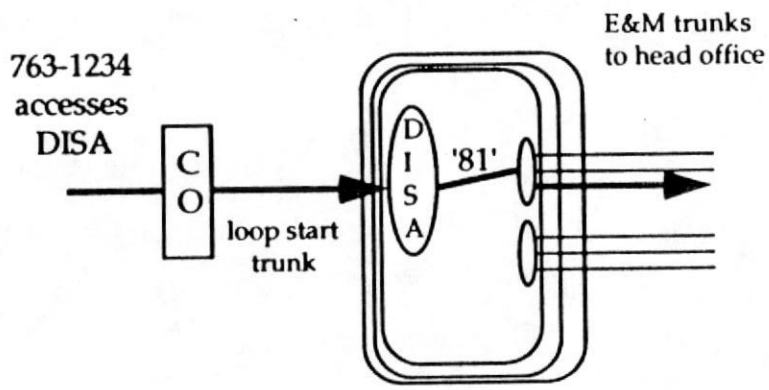
- requires <u>DID trunk cartridge</u> which provides 4 DID trunk circuits



Direct Inward System Access

- provide Remote Tandem Access from public network
- provide Remote Access from public network to selected Norstar features
- provide security access mechanism

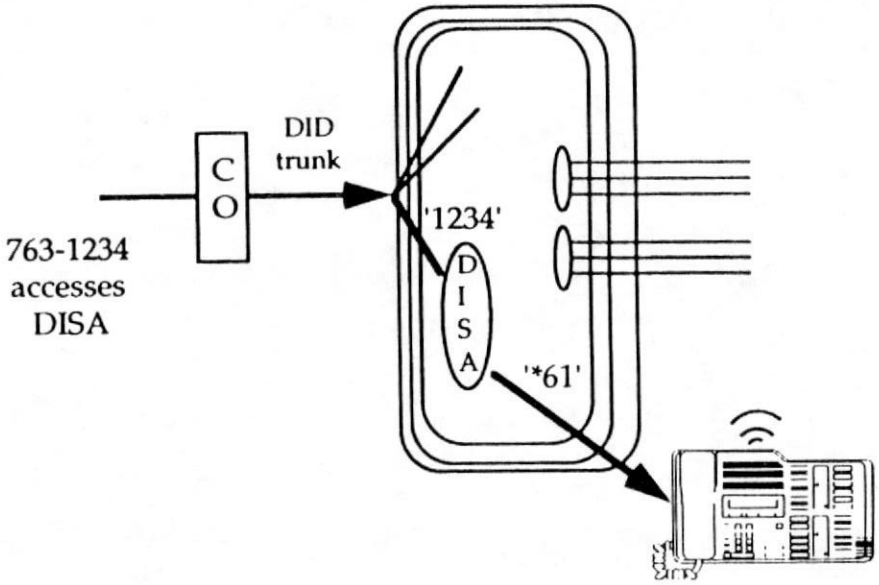
Remote Tandem Access:



Customer support rep at customer site wants to call technical rep at head office in another city

Remote Paging Access:

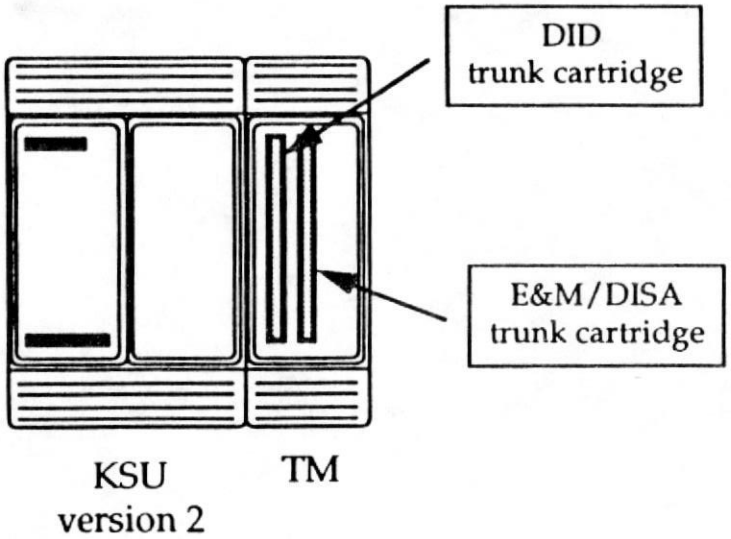
Gary at customer site calls warehouse to page parts department

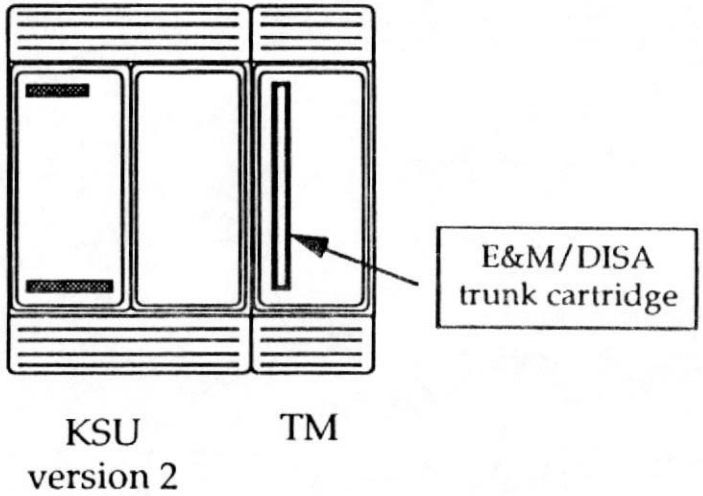


Direct Inward System Access

Configuration

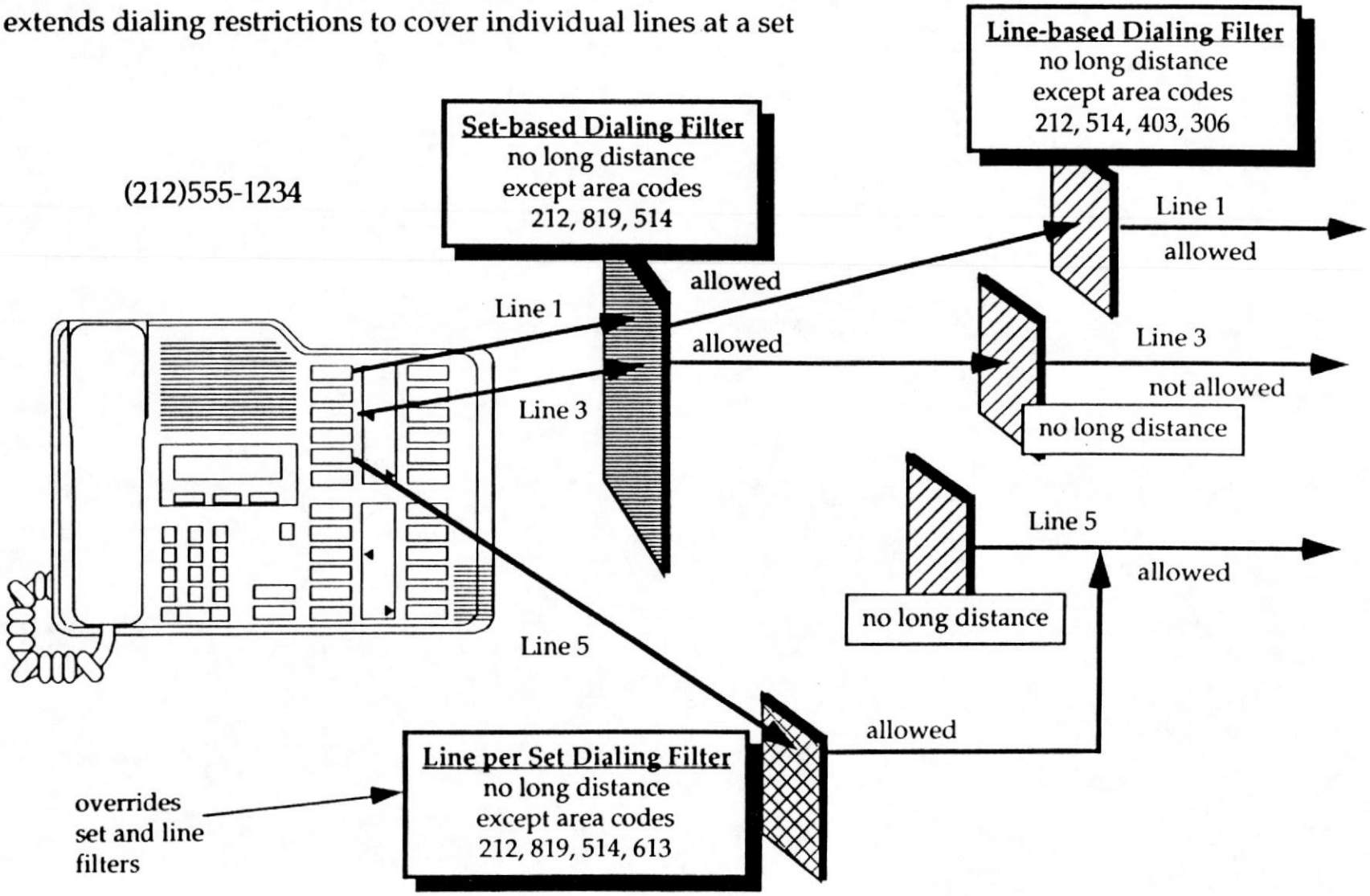
- requires incoming trunk to have disconnect supervision
- requires <u>E&M/DISA trunk cartridge</u> which provides 2 DISA DTMF receivers





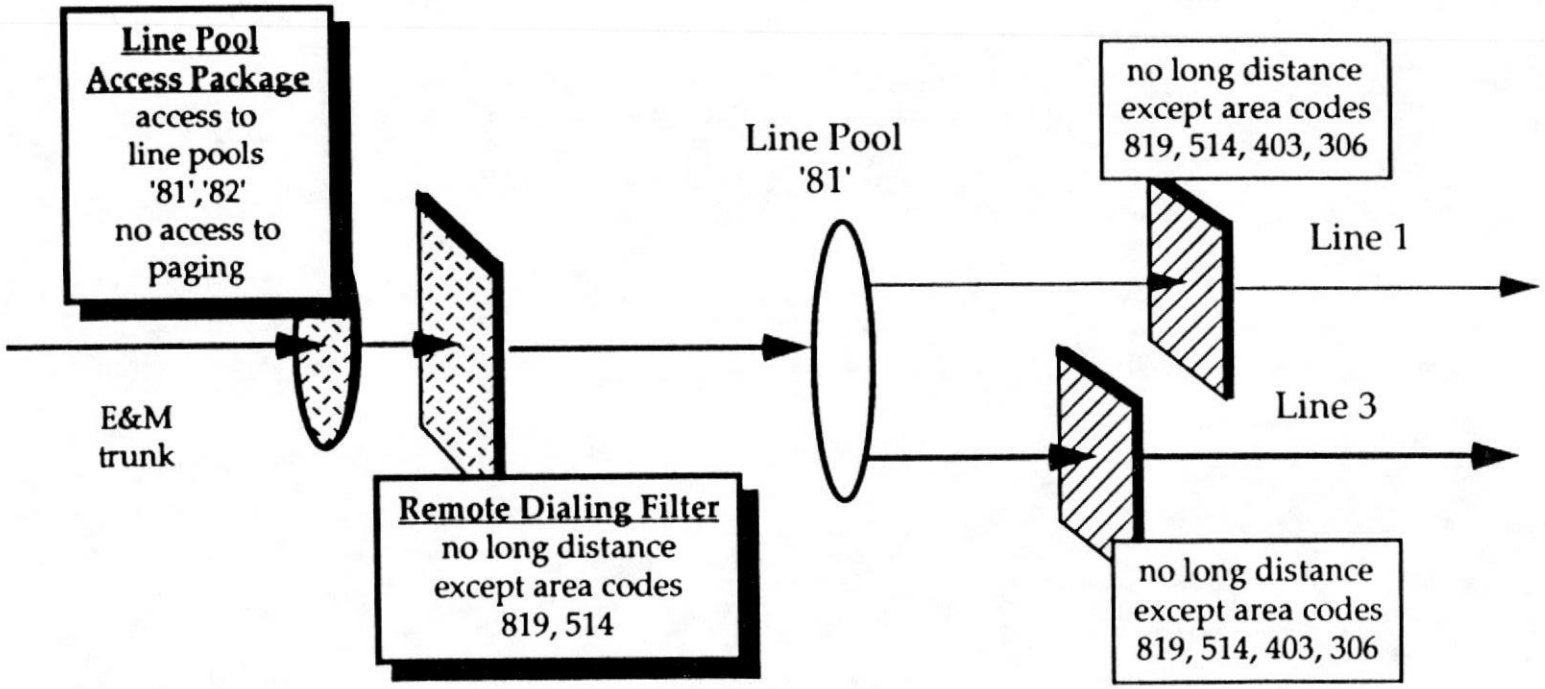
Dialing Filters for Norstar Users

- provides more flexibility in assigning dialing restrictions
- extends dialing restrictions to cover individual lines at a set



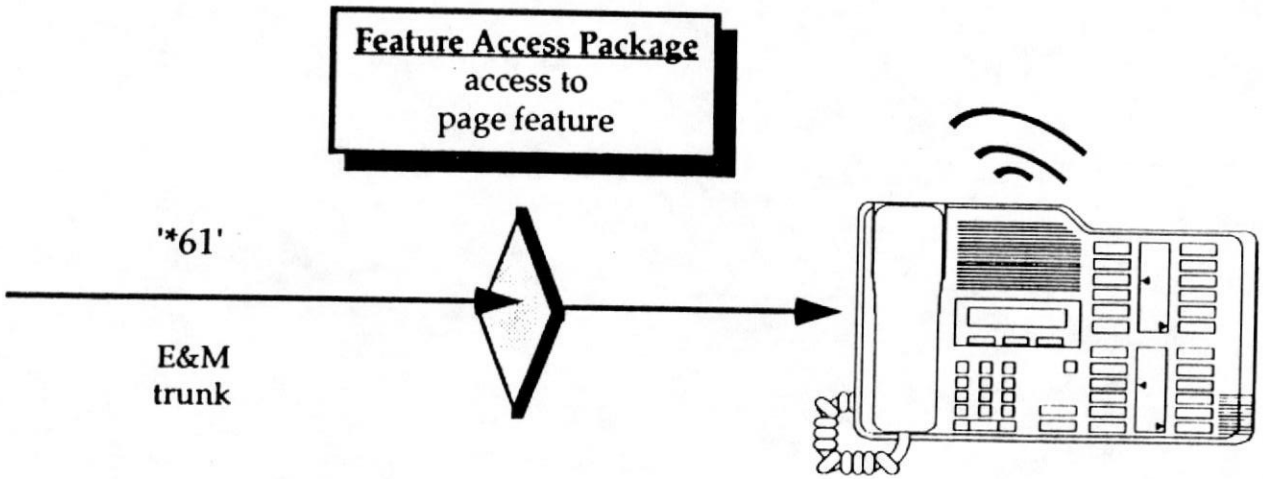
Remote Tandem Access

- applied to incoming lines:
  - controls remote caller's access to outgoing line pools and paging
  - defines restrictions to be applied on the outgoing digits dialled by the remote caller via filters applied to the lines



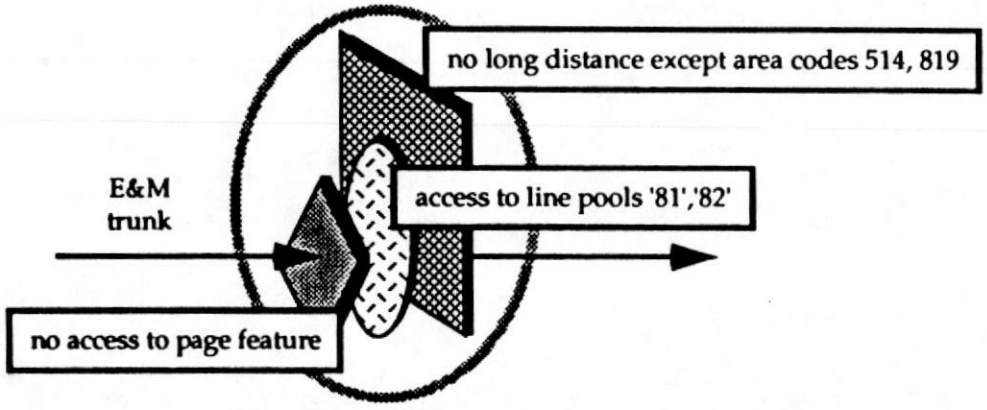
Remote Paging Access

- controls access to paging by remote callers

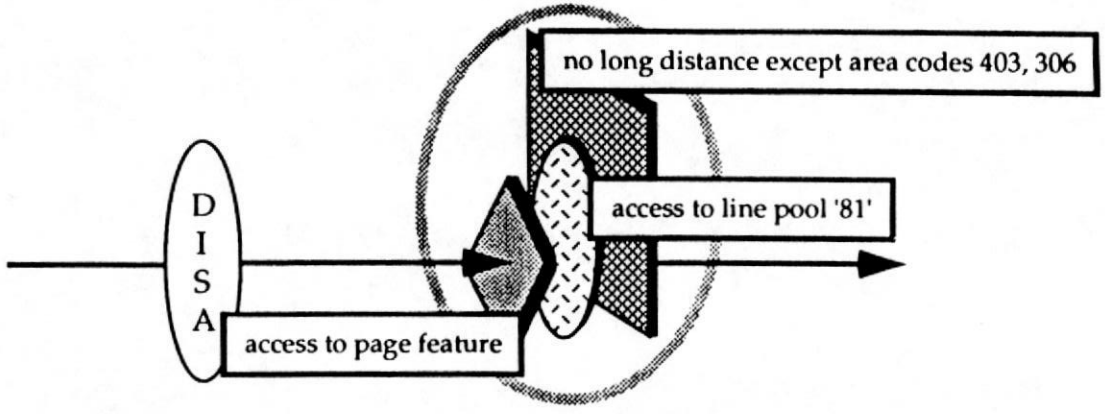


Class of Service

- a group of Remote Access capabilities
- consists of:
  - user filter
  - line filter
  - remote access package (defines line pool access & access to paging)



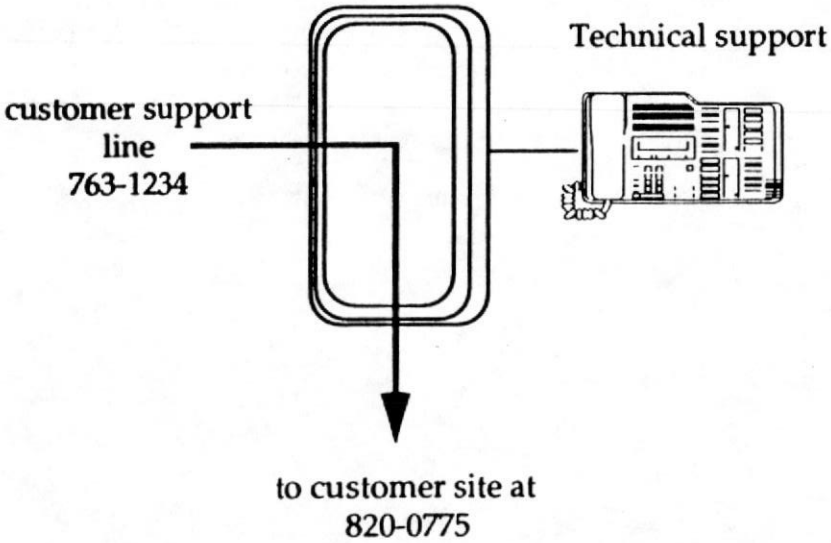
Class of Service A



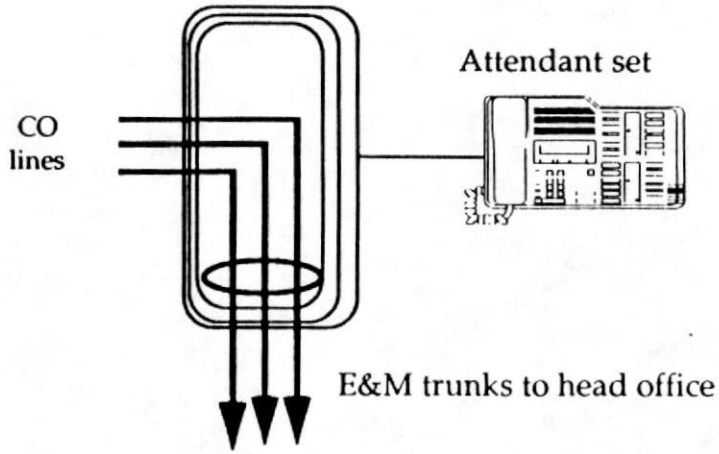
Class of Service B

Selective Line Redirection

- allows incoming calls on one line to be redirected over another line to a private network or public network destination
- differences from external call forward:
  - intercom calls are not forwarded, including external calls transferred via intercom
  - allows redirection of each line appearance to a different external number



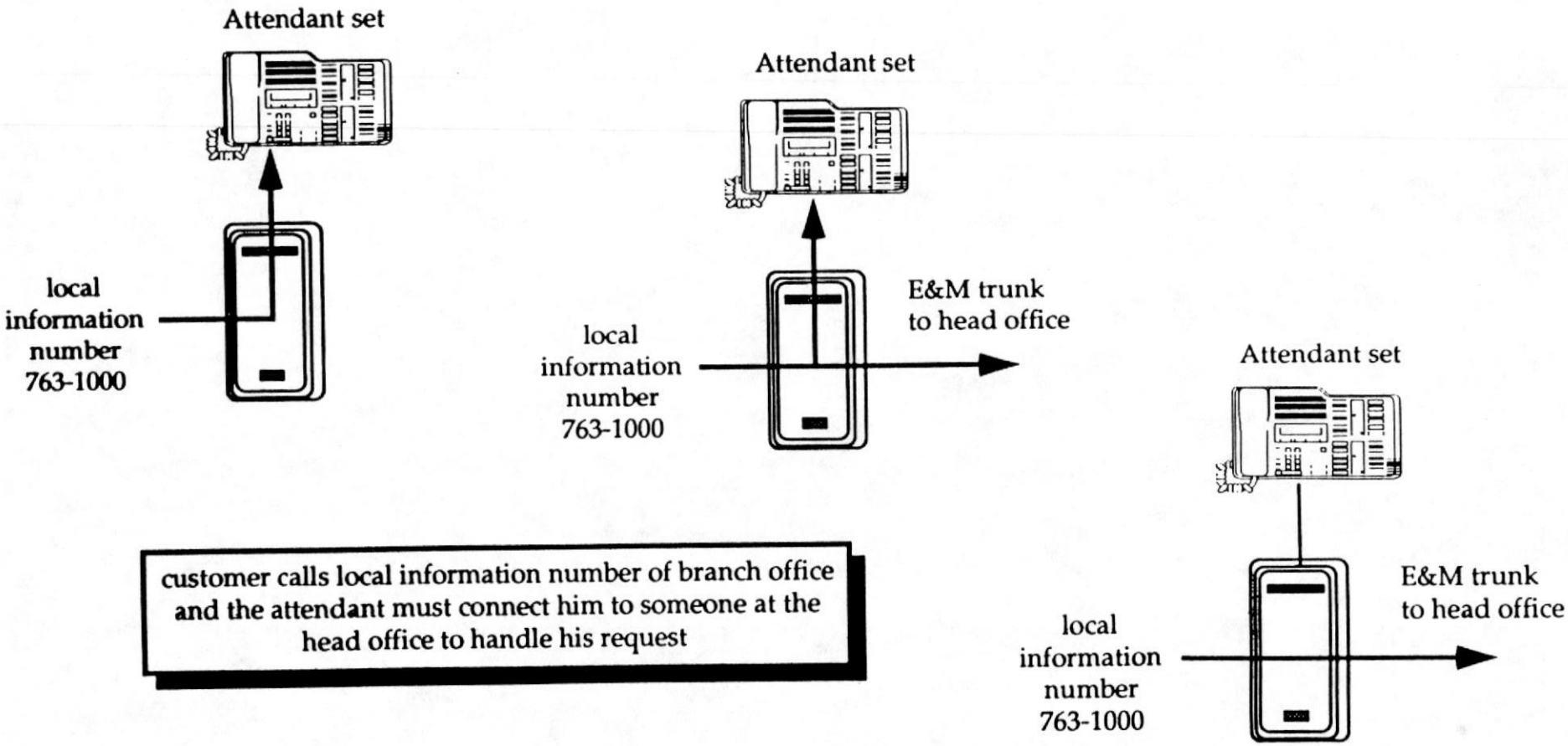
technical support rep is working at customer site, but wants to continue to receive calls to the customer support line



branch office attendant wants to have all incoming calls redirected to the head office for answering

External Transfer via Conference (Unsupervised Conference)

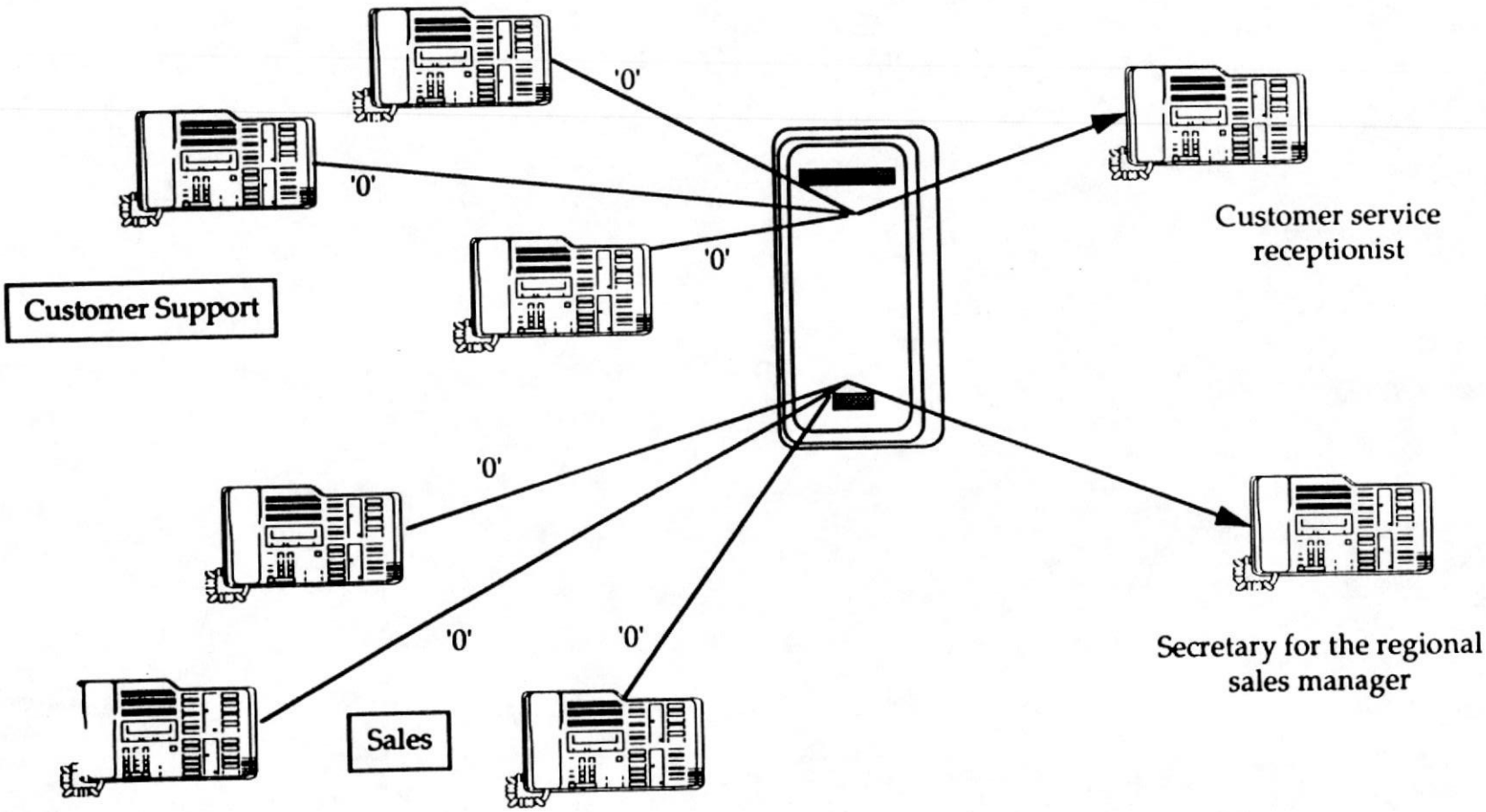
- allows a Norstar user to connect one external party to another external party and leave them connected when the Norstar user releases



customer calls local information number of branch office and the attendant must connect him to someone at the head office to handle his request

Multiple Attendant Sets

- increase the number of attendant sets to 5 to support larger installations
- station sets can direct attendant calls to a specific attendant able to deal with the nature of the call



Flexible Numbering Plan Extensions

Flexible Attendant Digit

- default is '0'
- applies systemwide
- can be set to 'none'

Flexible Call Park Prefix Digit

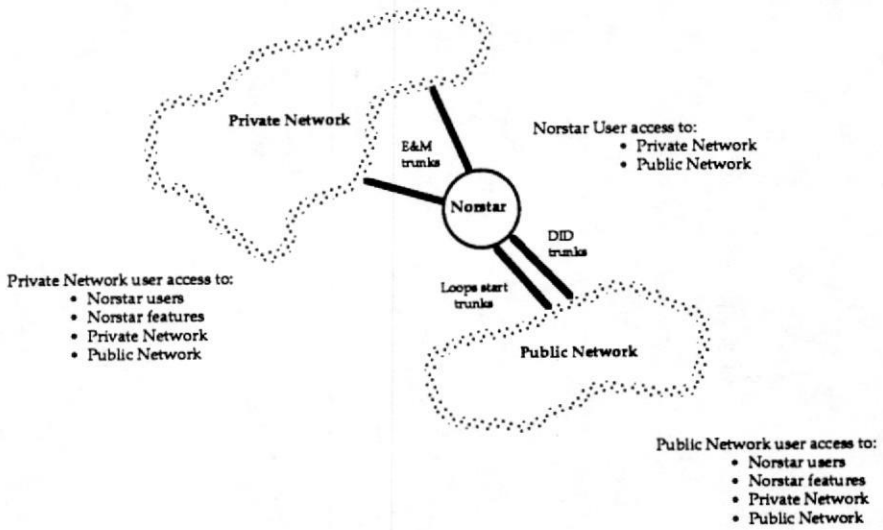
- default is '1'
- applies systemwide
- can be set to 'none'

Introduction to Norstar Modular DR4

- Modular DR4 Perspective
- Modular DR4 Content
  - Assumptions
  - Feature Operation
  - Configuration

DR4 Networking

CONTENT:
DR4 Software cartridge
E&M Trunk cartridge
DID Trunk Cartridge



Assumptions:

- Primary market as endpoint in intelligent network (ESN/ETN)
  - no support of network features or coordinated dialing plan
- Also support Norstar as a tandem node in a simple network
  - no coordinated / uniform dialing plan support or cross-network feature support

Operation:

Norstar user access to
- private network via E&M trunks
- to public network via loop start trunks

Private network access to
- Norstar users and features via E&M trunks
- private network via tandem access to E&M trunks
- public network via tandem access to loop start trunks

Public network access to
- Norstar users via loop start trunks and DID trunks
- Nor star feature via loop start trunks and DID trunks with DISA
- private network via loop start trunks and DID trunks with DISA and tandem access to E&M trunks
- public network via loop start trunks and DID trunks with DISA and tandem access to loop start trunks

DR4 New Content

Private Network Connectivity

- E&M trunking

Public Network Connectivity

- Direct Inward Dialing
- Direct Inward System Access

Enhanced Restriction Capabilities

- applied to Norstar users
- applied to Remote users

Network Access Features

- Selective Line Redirection
- Unsupervised Conference

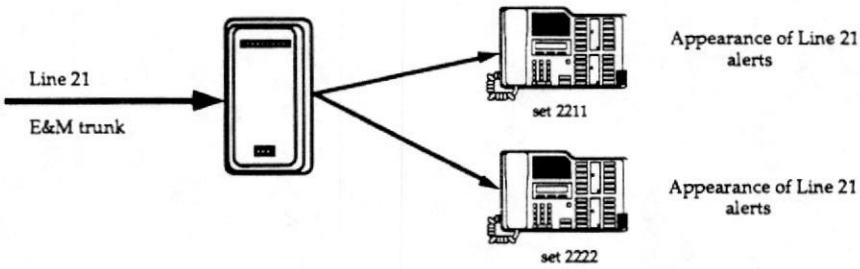
Multiple Attendant Sets

Flexible Numbering Plan Extensions

- Attendant Digit
- Call Park Prefix Digit

Manual Answer E&M Trunk

• provides E&M trunk appearance in a standard key system configuration



Assumptions:

• direct appearance of E&M trunk may be required for tariffing reasons. Is this the case?

Operation:

• appearance of trunk appears on line key on sets

• line appearance alerts when incoming E&M trunk is seized

  - private network "hotline" service for high-usage connections

• same operation as incoming loop start trunks in DR3

Auto-Answer E&M Trunk

- provides Remote Access to:
  - Norstar sets
  - outgoing line pools
  - selected Norstar features
- routes call according to received digit string

Operation:

- When seizure of auto-answer E&M trunk is detected, dial tone is returned and a digit string is expected:
  - for ESN, digit string is received from intelligent node switch
  - for simple network connection, the caller dials the digits
- Norstar parses the digits and connects the call accordingly

Auto-Answer E&M Trunk

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  - Norstar sets
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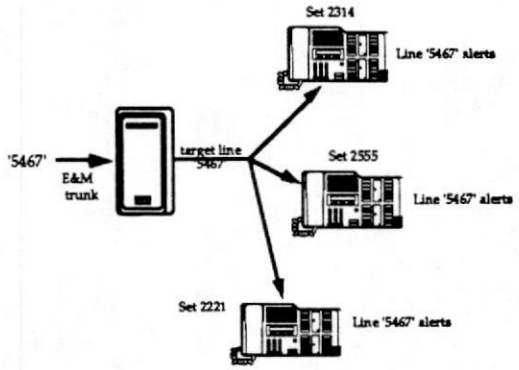
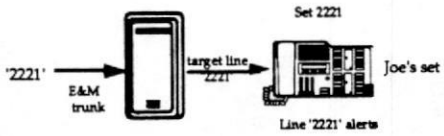
Auto-Answer E&M Trunk

Remote Access to Sets:



Attendant Bypass

caller dials 2221 to reach Joe



caller dials 5467 to reach parts dept

Line Concentration

- Attendant by-pass configuration is default
  - Each set has single appearance of a target line. The set is considered to be the **target set** for that target line.
  - Incoming digit string used to select a target line will default to being the same as the target set's DN.
- Administration can be used to provide multiple appearances of a target line to provide line concentration scenario.
- Mapping of incoming digit strings to target lines allows internal changes to Norstar numbering plan without requiring changes to external digits dialed (i.e. network directories).

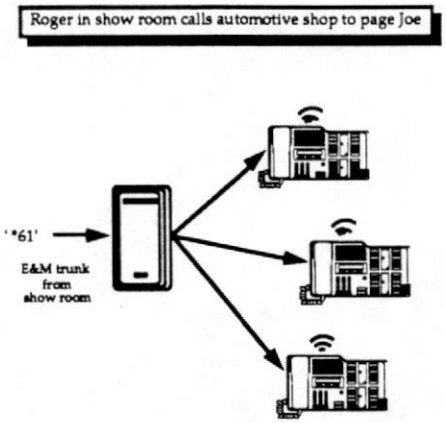
Questions:

- Do we need digit stripping for digit strings from the ESN network?
- If line pool or feature is busy, do we return dial tone and allow the caller another chance or do we release the call?

Auto-Answer E&M Trunk

Remote Tandem Access:

Remote Paging Access:



- If line pool access codes are configured to be the same length as the Norstar numbering plan, then it is possible for ESN network callers to automatically select an available outgoing line from a line pool.
- What features should be available to remote users?

E&M Trunks - Incoming

- provides private network user with
  - Remote Access to Norstar sets
  - Remote Access to selected Norstar features
  - Remote Tandem Access to public and private networks
- extends existing Norstar call coverage features to incoming calls on E&M trunks

---

Assumptions

- want to have incoming external calls on E&M trunks to have the same call coverage available on CO trunks:

  set-based: multiple line appearances (transfer via hold, privacy release)

  call forward all, call forward busy, call forward no answer

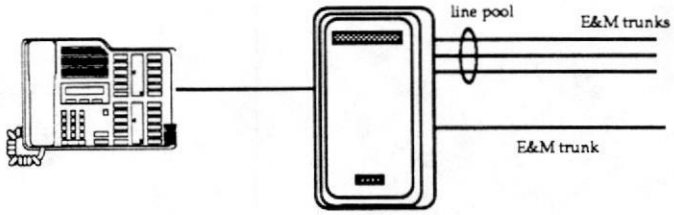
  answer keys

  line-based: service modes

  prime set functionality (DRT, HLR)

E&M Trunks - Outgoing

• provides Norstar user with access to the private network



Assumptions:

• line pools used to access shared outgoing trunks (increased number of line pools provided)

Operation:

• use linepool access codes to select line from an E&M line pool (DR3 linepool features apply)

- line pool BLF
- line pool RAG

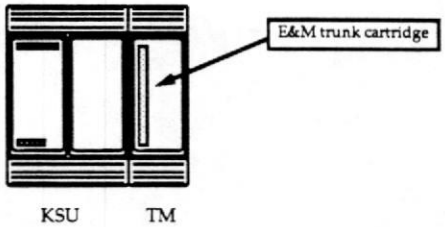
• line appearance key press to select E&M trunk (or tie line) directly

- Line appearances of E&M trunks follow normal Norstar handling for outgoing lines

E&M Trunks

Hardware Configuration

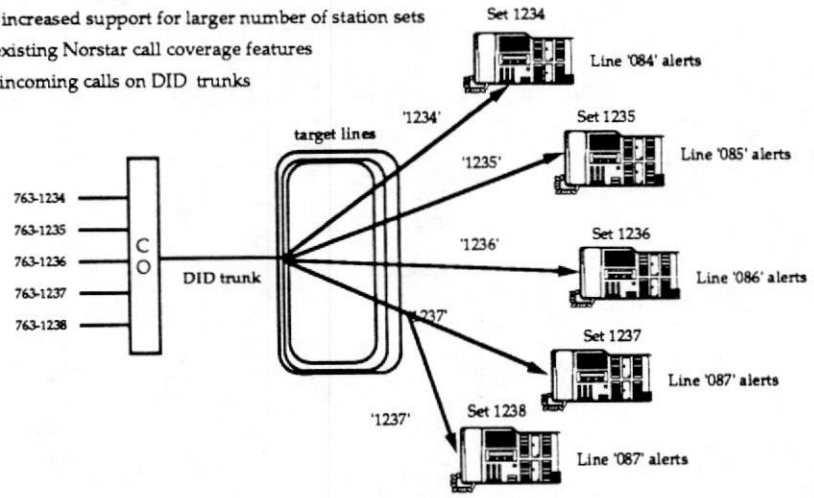
• requires E&M/DISA trunk cartridge which provides 2 E&M trunk circuits



- E&M trunk / DTMF receiver card:
  - provides 4-wire E&M type II signalling
  - 2 E&M circuits per card with dedicated DTMF receivers
  - supports immediate dial, wink start, delay dial
  - card also provides 2 DTMF circuits for use with DISA feature
- System must be properly provisioned to handle local Norstar requirements as well as network requirements:
  - incoming call access
  - remote tandem access

Direct Inward Dialing

- provides public network access to station sets
- provides attendant by-pass
- provides increased support for larger number of station sets
- extends existing Norstar call coverage features to incoming calls on DID trunks



Re-emphasizing points raised with E&M auto-answer trunks.

Assumptions:

- want to provide direct inward dialing capability in a manner that continues to support the existing Norstar features for external call coverage

Operation:

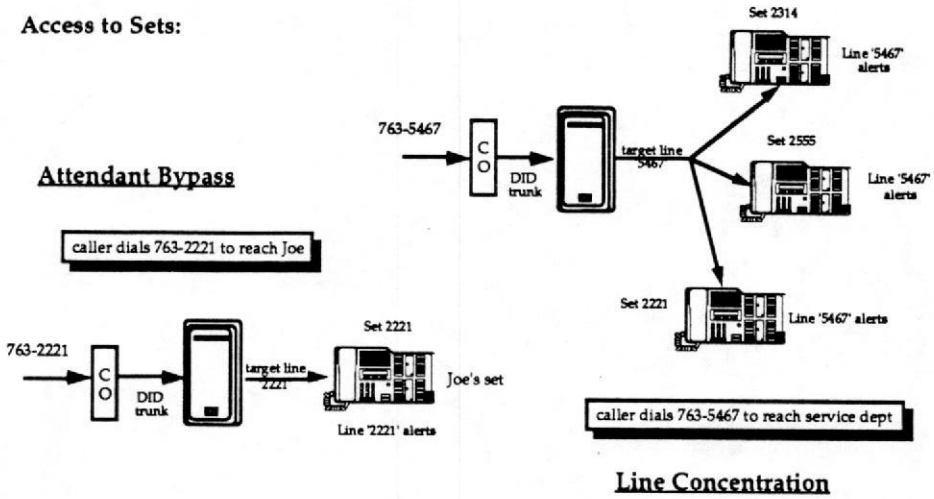
- Direct inward dialing capability is provided in a new way that makes use of the key system model to provide attendant bypass capability:
  - External calls continue to be presented on **lines** so that Norstar user can easily distinguish between external callers and internal callers
  - When an auto-answer trunk receives a digit string, it connects to a new type of incoming-only line called a **target line**.
  - Direct inwardaccess to station sets is provided by having enough target lines so that every set can have an appearance of a separate target line
  - Norstar call coverage is maintained because target lines can have multiple appearances and are handled in exactly the same way as incoming CO lines.
- Overflow Call Routing to the prime set is provided for a target line if the target line is busy when another incoming call on an auto-anser trunk is trying to connect to it.
- Target lines provide single key access to private network calls and DID calls.

Questions:

- Is this an acceptable model?
- Should target line key be able to select an outgoing line?

Direct Inward Dialing

Access to Sets:

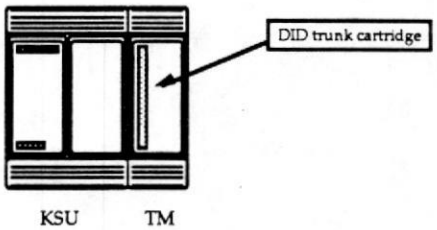


- Re-iteration of the points for E&M auto-answer trunks.
- Attendant by-pass configuration is default
  - Each set has single appearance of a target line. The set is considered to be the **target set** for that target line.
  - Incoming digit string used to select a target line will default to being the same as the target set's DN.
- Administration can be used to provide multiple appearances of a target line to provide line concentration scenario.
- Mapping of incoming digit strings to target lines allows internal changes to Norstar numbering plan without requiring changes to external digits dialed (i.e. network directories).

DID Trunks

Hardware Configuration

• requires DID trunk cartridge which provides 4 DID trunk circuits



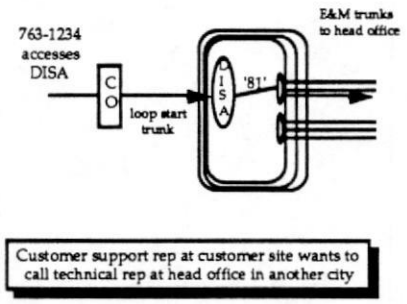
Operation:

- DID card:
  - 4 DID trunk circuits with dedicated DTMF receivers
- DID trunks are incoming only
- System must be properly provisioned to handle local Norstar requirements as well as network requirements:
  - incoming call access
  - remote tandem access

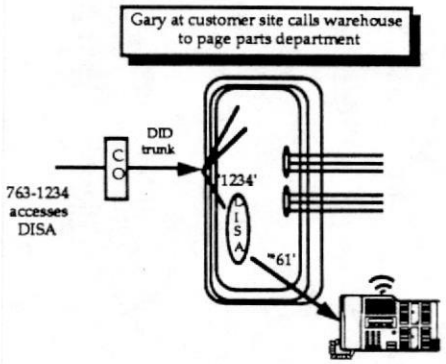
Direct Inward System Access

- provide Remote Tandem Access from public network
- provide Remote Access from public network to selected Norstar features
- provide security access mechanism

Remote Tandem Access:



Remote Paging Access:



Operation:

- requires an auto-answer trunk providing disconnect supervision
  - will work on CO line
    - single user access to DISA
  - will work behind DID trunk
    - several users can use single DISA number at same time (depends on the number of DID trunks installed)
- Auto-answer trunks with DISA may have appearances on sets, and may be selected to make outgoing calls if idle.

- stutter dial tone prompts caller to enter authorization password
- valid authorization password:
  - determines what features and line pools can be accessed
  - defines the incoming dialing restrictions for the call
  - will discuss under section on restrictions
- 100 authorization passwords of 6 digits

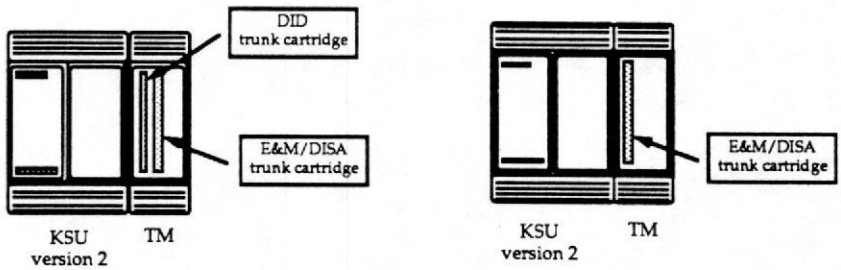
Questions:

- Enough authorization passwords? the right length?

Direct Inward System Access

Configuration

- requires incoming trunk to have disconnect supervision
- requires E&M/DISA trunk cartridge which provides 2 DISA DTMF receivers



- System must be properly provisioned to handle local Norstar requirements as well as network requirements:
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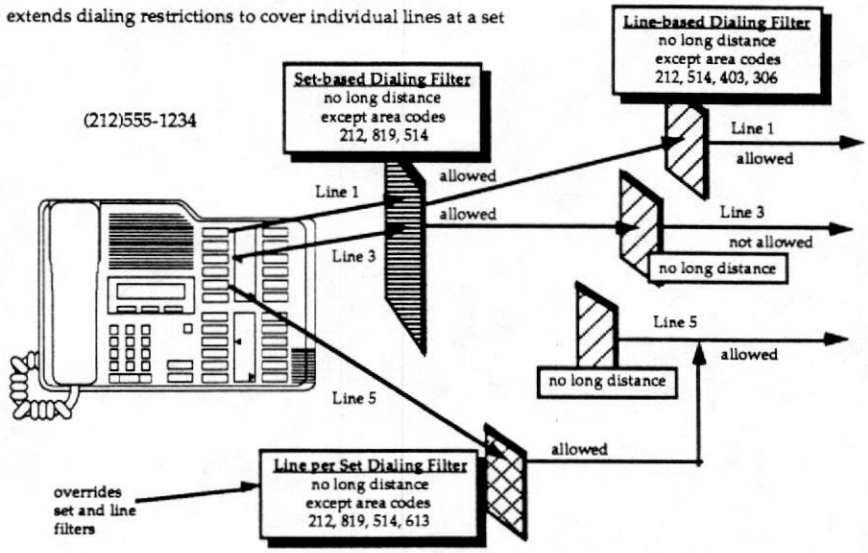
  - remote tandem access

Dialing Filters for Norstar Users

- provides more flexibility in assigning dialing restrictions
- extends dialing restrictions to cover individual lines at a set



Assumptions:

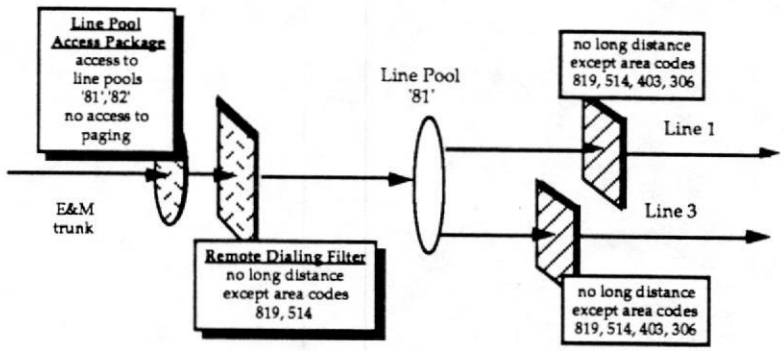
- Larger businesses tend to be grouped by functionality into departments. Dialing patterns required by employees with similar job functions are likely to be the same.
- The larger number of lines and sets possible will make configuration and administration of restrictions/overrides an arduous task with the existing model.
- Existing model does not provide sufficient override capability.

Operation:

- A number of dialing restrictions and their associated exceptions can be grouped together into a **dialing filter.**
  - no arbitrary limit on the number of exceptions that may apply to a restriction
  - filters will be maintained in a system wide pool
- Dialing filters can be applied
  - to a line (existing DR3 capability)
  - to all lines appearing at a set (existing DR3 capability)
  - to individual lines appearing at a set (new DR4 capability)
- Line/set filters replace any existing set-based or line-based filters.

Remote Tandem Access

- applied to incoming lines:
  - controls remote caller's access to outgoing line pools and paging
  - defines restrictions to be applied on the outgoing digits dialled by the remote caller via filters applied to the lines



Assumptions:

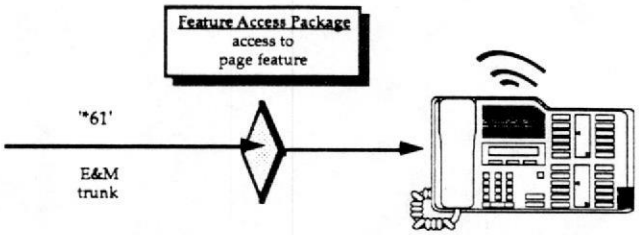
- Remote callers should not have unrestricted access to Norstar tandem facilities
  - line pools
  - outgoing digits dialed

Operation:

- The Norstar line pools and the Norstar features that are available to the remote tandem caller are grouped into an **access package**.
- The tandem digits dialed by the remote caller are restricted by the **remote dialing filter.** (Similar in application to the set-based dialing filter.)
- The access package and the remote dialing filter used for a tandem call are assigned
  - to the incoming E&M trunk through administration
  - to a DISA trunk by association with the authorization passwordused by the caller

Remote Paging Access

• controls access to paging by remote callers



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- The access package and the remote dialing filter used for a tandem call are assigned
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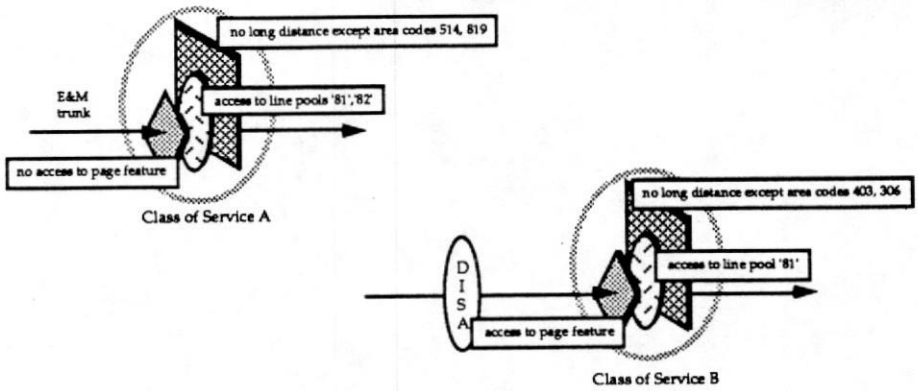
  - to a DISA trunk by association with the authorization passwordused by the caller

Questions:

- What is the desired set of features?

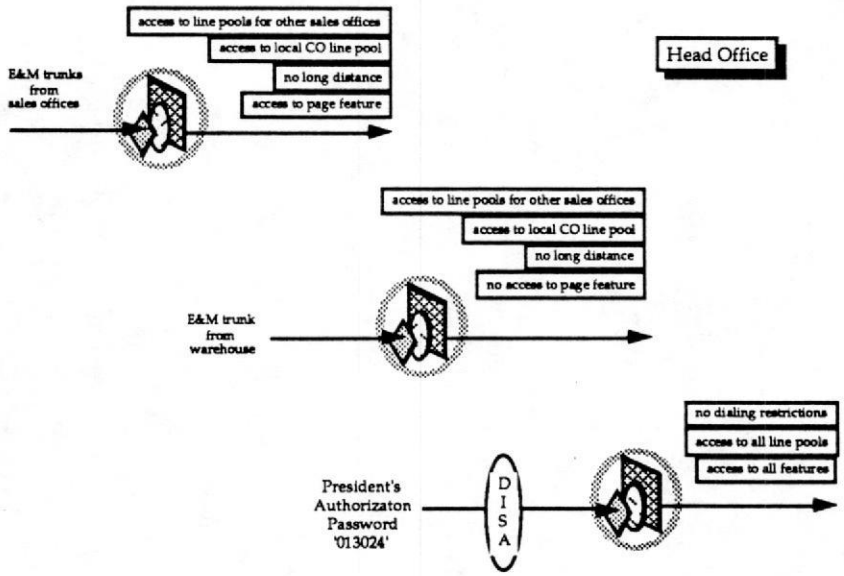
Class of Service

- a group of Remote Access capabilities
- consists of:
  - user filter
  - line filter
  - remote access package (defines line pool access & access to paging)



- Class of service denotes a grouping of a remote dialing filter, and an access package consisting of line pool access privileges and feature access priliviges
- The Class of Service is active for the duration of the call.
- The Class of Service for calls on E&M trunks is the Class of Service administered to the trunk.
- The Class of Service for calls on DISA trunks is the Class of Service administered to the DISA authorization password entered by the caller.

Class of Service Assignments



Selective Line Redirection

- allows incoming calls on one line to be redirected over another line to a private network or public network destination
- differences from external call forward:
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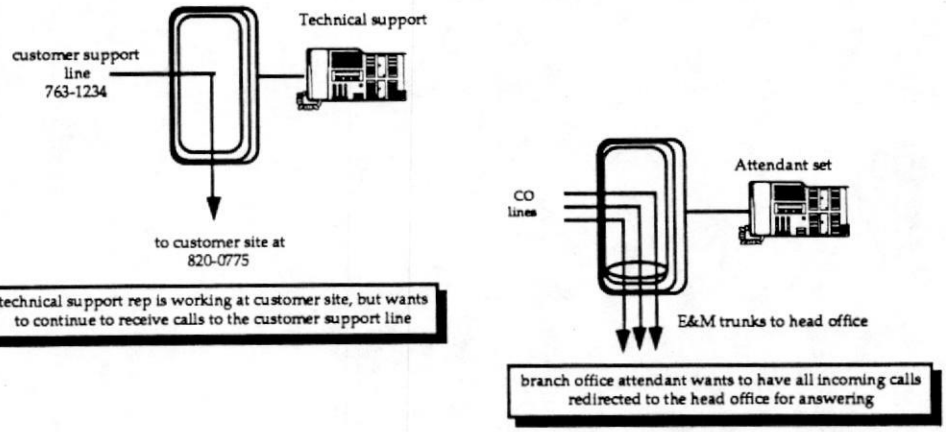
  - allows redirection of each line appearance to a different external number

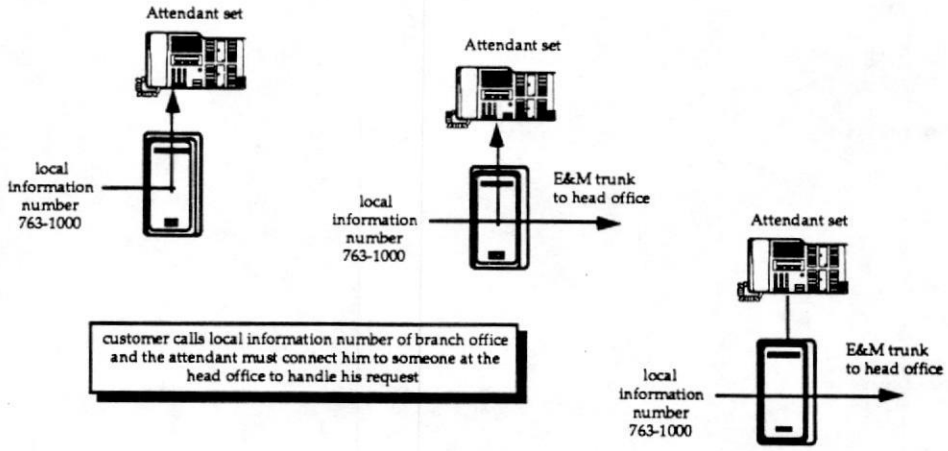


- Network access features are features that provide the Norstar user with enhanced access to both the private and public networks.

- Redirection can be applied to all types of incoming lines:
  - target lines
  - CO trunks
  - E&M trunks
- Lines to carry the redirected calls can be selected by:
  - line appearance
  - line pool access codes
- Idle redirected lines can be selected to make outgoing calls (except target lines)
- Caller's set must have an appearance of the line before it can be redirected
- Dialing restrictions are applied at the time the line is redirected.
- Redirected calls are not subject to dialing restrictions (in case outgoing line restrictions are changed while calls are redirected out on the line).

External Transfer via Conference (Unsupervised Conference)

- allows a Norstar user to connect one external party to another external party and leave them connected when the Norstar user releases



Operation:

- Incoming calls must occur on trunks providing disconnect supervision
- Incoming call can be conferenced in with another external party, and left connected if the Norstar party wishes when he is finished.
- If the Norstar user wished to re-enter the connection, he must use the conference hold feature.
- If the Norstar user has initiated both calls, then the trunks should have answer supervision as well.

Hardware Compatibility Issues:

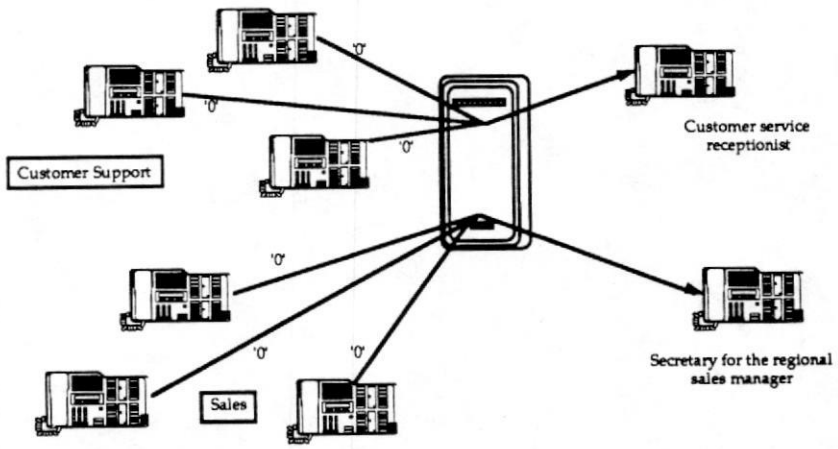
- In a system in which not all trunks have disconnect supervision and answer supervision can have inconsistent Network Access feature operation in some cases.

Questions:

- Unsure what to call the feature. What does "unsupervised conference" mean to the audience?

Multiple Attendant Sets

- increase the number of attendant sets to 5 to support larger installations
- station sets can direct attendant calls to a specific attendant able to deal with the nature of the call



Assumptions:

- Larger companies will tend to be divided into groups according to job function.
- Attendant needs to have knowledge of group function in order to handle calls properly.

Operation:

- Sets can be administered to direct attendant calls to a specific attendant set.
- Attendant sets can be the same as (E)CAP positions.
- Providing 5 attendant sets.
- Not providing call distribution.

Questions:

- How many attendant sets likely necessary?

Flexible Numbering Plan Extensions

Flexible Attendant Digit

- default is '0'
- applies systemwide
- can be set to 'none'

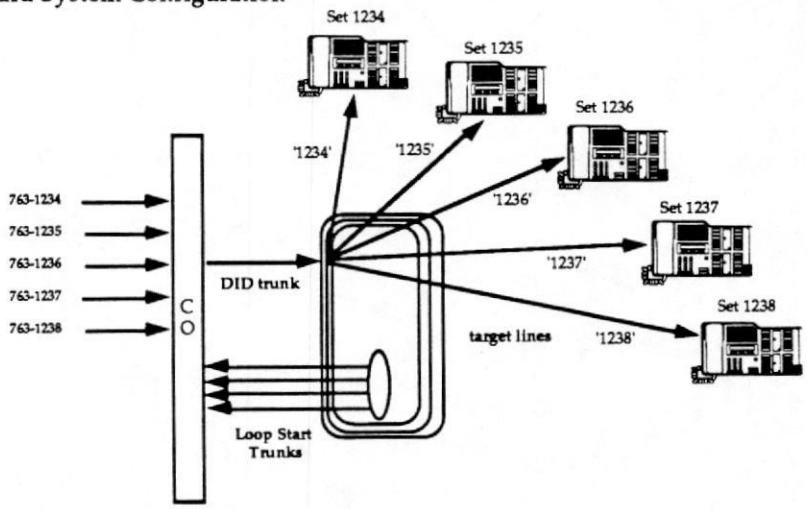
Flexible Call Park Prefix Digit

- default is '1'
- applies systemwide
- can be set to 'none'

- If the Attendant Digit is set to none, single digit access to the attendant is not possible from a Norstar set.
- If the Call Park Prefix Digit is set to none, calls cannot be parked or retrieved.

Direct Inward Dialing

Standard System Configuration



additional slide

Assumptions:

- Standard DID configuration would use DID trunks for all incoming calls and pooled loop start trunks for all outgoing calls.

Installer Features

Modular DR3 to Modular DR4 Software Upgrade

- single step upgrade procedure
- no loss of programming except for restrictions

Modular DR2 to Modular DR4 Software Upgrade

- two stage upgrade procedure
  - upgrade Modular DR2 to Modular DR3
  - upgrade Modular DR3 to Modular DR4
- no loss of programming except for restrictions

Alternate slide for Software Upgrades

northern telecom — PRIVATE NETWORKS — norstar

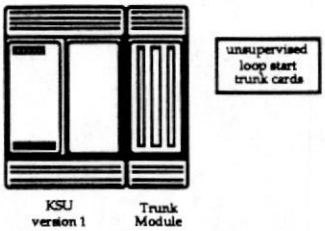
KSU	standard	add E&M trunks	add DISA	add DID trunks
KSU version 1	• DR3 features • Enhanced Restrictions • more line pools • Multiple Attendant Sets • extensions to Flexible Numbering Plan	• access to E&M trunks • Pvt Net access to sets • Pvt Net tandem access - to Pvt Net - to PSTN • Pvt Net access to features • Selective Line Redirection - Pvt Net to Pvt Net and PSTN • Unsupervised Conference - Pvt Net to Pvt Net and PSTN	• requires additional supervised loop start or DID trunk • PSTN tandem access to - PSTN - Pvt Net (if equipped) • PSTN access to features	• PSTN access to sets
KSU version 2	• DR3 features • Enhanced Restrictions • more line pools • Multiple Attendant Sets • extensions to Flexible Numbering Plan • Selective Line Redirection - PSTN to PSTN • Unsupervised Conference - PSTN to PSTN	• access to E&M trunks • Pvt Net access to sets • Pvt Net tandem access - to Pvt Net - to PSTN • Pvt Net access to features • Selective Line Redirection - Pvt Net to Pvt Net and PSTN - PSTN to Pvt Net • Unsupervised Conference - Pvt Net to Pvt Net and PSTN - PSTN to Pvt Net	• requires no extra trunk • PSTN tandem access to - PSTN - Pvt Net (if equipped) • PSTN access to features	• PSTN access to sets

- Most DR4 functionality requires trunks to have disconnect supervision to work properly
- A mixture of supervised and unsupervised loop start trunks could cause perceived inconsistent operation of some DR4 features (Selective Line Redirection, Unsupervised Conference)
- Options for DR4 operation in mixed trunk scenario:
  - DR4 does not become operational
  - enable/disable features when no/any unsupervised loop start trunks are detected
  - maintain detection of trunk capability at time of feature activation, and use documentation on how to configure the system to minimize inconsistent feature operation

Questions:

- What do the telcos want?

Hardware Configurations



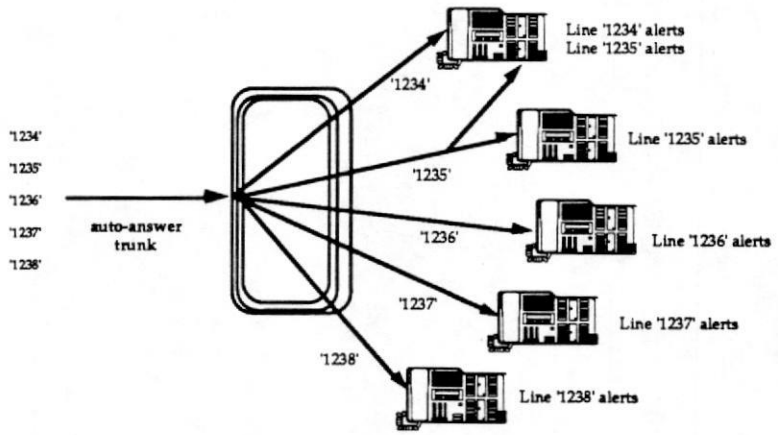
unsupervised loop start trunk cards

supervised loop start trunk cards

supervised loop start trunk cards
+
unsupervised loop start trunk cards

Direct Inward Access to Station Sets

- provides attendant by-pass
- maintains the key system model
  - incoming calls appear on incoming-only lines



alternate slide

Assumption:

- want to provide direct inward dialing capability in a manner that continues to support the existing Norstar features for external call coverage

Operation:

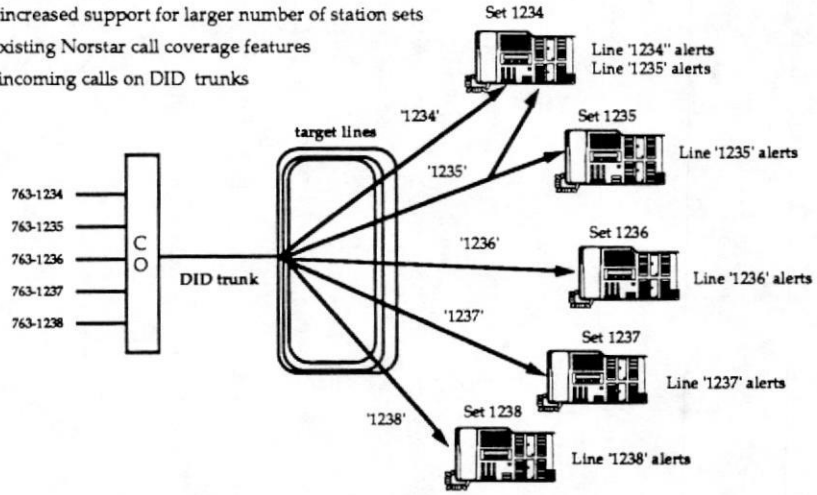
- Direct inward dialing capability is provided in a new way that makes use of the key system model to provide attendant bypass capability:
  - External calls continue to be presented on **lines** so that Norstar user can easily distinguish between external callers and internal callers
  - When an auto-answer trunk receives a digit string, it connects to a new type of incoming-only line called a **target line**.
  - Direct inwardaccess to station sets is provided by having enough target lines so that every set can have an appearance of a separate target line
  - Norstar call coverage is maintained because target lines can have multiple appearances and are handled in exactly the same way as incoming CO lines.
- Overflow Call Routing to the prime set is provided for a target line if the target line is busy when another incoming call on an auto-answer trunk is trying to connect to it.

Questions:

- Is this an acceptable model?
- Should target line key be able to select an outgoing line?

Direct Inward Dialing

- provides public network access to station sets
- provides attendant by-pass
- provides increased support for larger number of station sets
- extends existing Norstar call coverage features to incoming calls on DID trunks



alternate slide

Re-emphasizing points raised with E&M auto-answer trunks.

Assumptions:

- want to provide direct inward dialing capability in a manner that continues to support the existing Norstar features for external call coverage

Operation:

- Direct inward dialing capability is provided in a new way that makes use of the key system model to provide attendant bypass capability:
  - External calls continue to be presented on **lines** so that Norstar user can easily distinguish between external callers and internal callers
  - When an auto-answer trunk receives a digit string, it connects to a new type of incoming-only line called a **target line**.
  - Direct inwardaccess to station sets is provided by having enough target lines so that every set can have an appearance of a separate target line
  - Norstar call coverage is maintained because target lines can have multiple appearances and are handled in exactly the same way as incoming CO lines.
- Overflow Call Routing to the prime set is provided for a target line if the target line is busy when another incoming call on an auto-anser trunk is trying to connect to it.
- Target lines provide single key access to private network calls and DID calls.

Questions:

- Is this an acceptable model?

Controlling Trunk-to-Trunk Connections

- **Connection via Remote Tandem Access:**
  - is controlled through the Line Pool Access Package and Dialing Filters of the Class of Service assigned to the remote caller.
  - is controlled through the Dialing Filters assigned to the outgoing lines.
  - is only allowed from a trunk providing disconnect supervision.
- **Connection via Line Redirection:**
  - is only allowed from a trunk providing disconnect supervision.
  - is controlled through Dialing Filters.
  - requires explicit user action to invoke.
- **Connection via Unsupervised Conference:**
  - is only allowed with trunks providing disconnect supervision.
  - requires explicit user action to invoke.

---

backup slide describing trunk-to-trunk connection control points.

Preventing Trunk-to-Trunk Connections

Option 1:

System-wide feature enable / disable

Option 2:

Subject all trunk-to-trunk connections to a system-wide disconnect timer.

Backup slikde.

Option 1:

- Customer uses system admin parameter to determine if he wishes trunk-to-trunk connections to be allowed in the system.

Option 2:

- System-wide timer applies to all trunk to trunk connections in the system
- If time-out, connection is dropped (warning tone given first)
- Handles case of poor outside plant not delivering supervision signals properly
- Timer set to 0 covers case of preventing all trunk-to-trunk connections

Software Upgrades

Modular DR3 to Modular DR4

- single step upgrade procedure
- no loss of programming except for restrictions

Modular DR2 to Modular DR4

- two stage upgrade procedure
  - upgrade Modular DR2 to Modular DR3
  - upgrade Modular DR3 to Modular DR4
- no loss of programming except for restrictions

Assumptions:

- The DR2 to DR4 upgrade market is viewed to be very small.
- Because of the changes to provide more flexibility in assigning Restrictions, retaining the previous restrictions is not possible.
- The standard set of default restrictions will still be provided.

RESUMEN TÉCNICO

norstar

- The Philosophy Of Meridian Norstar DR4 Is To Competitively Position The Product In A Total "Network" Connectivity Environment

- The Main Features Of Modular DR4 Are A Means To Provide Connectivity Within A Private Network (E&M Tie Line Trunking) And Utilize Line Concentration From The Public Network (Direct-Inward-Dialing)

Compiled & Edited
By John Jenkins

Illustrated By
Lynn Mowat

Apendix 1 & 2
By Al Jacques

DR4 EXECUTIVE SUMMARY

INTRODUCTION

Strategic to most business communities is networking of telecommunications. Networking can be defined as the exchange of information or services among individuals, groups or in situations via an interconnected, or inter-related chain, group or system. Specifically, Telecommunications Networking is a group of switching systems linked together to permit end-to-end communications on a transparent basis.

Today's business community has recognized the importance of telecommunications networking as both a cost savings and competitive tool. In response to this, Norstar DR4 provides small line application PBX functionality, mainly through enhanced trunking capabilities (E&M trunking and Direct Inward Dialing trunking).

Following are brief descriptions of Enhanced DR4 capabilities, as well as detailed information sections on each new feature.

- **Private Network Connectivity**

  E&M (Excipere & Mittere) trunks provide a direct circuit or tie line between two subscriber (customer) systems utilizing industry standard Type II Interface.

- **Public Network Connectivity**

  Direct Inward Dialing (DID) trunking is a service provided by the Telephone Company (Central Office - C.O.) which allows an incoming call to reach a specific PBX/Key System station without attendant assistance. DID paths are employed to reduce the number of physical connections (paths) between the PBX/Key System and the C.O., they are one-way inbound trunks.

  Direct Inward System Access (DISA) is a facility which provides an outside caller with the ability to dial directly into a PBX/Key System without attendant intervention, to gain access to system facilities and outgoing trunk circuits.

- **Network Access Features**

  Selective Line Redirection (SLR) or external call forward allows any user to redirect incoming calls on one or more external lines to external only destinations (Feature 84).

DR4 NETWORK CONNECTIVITY

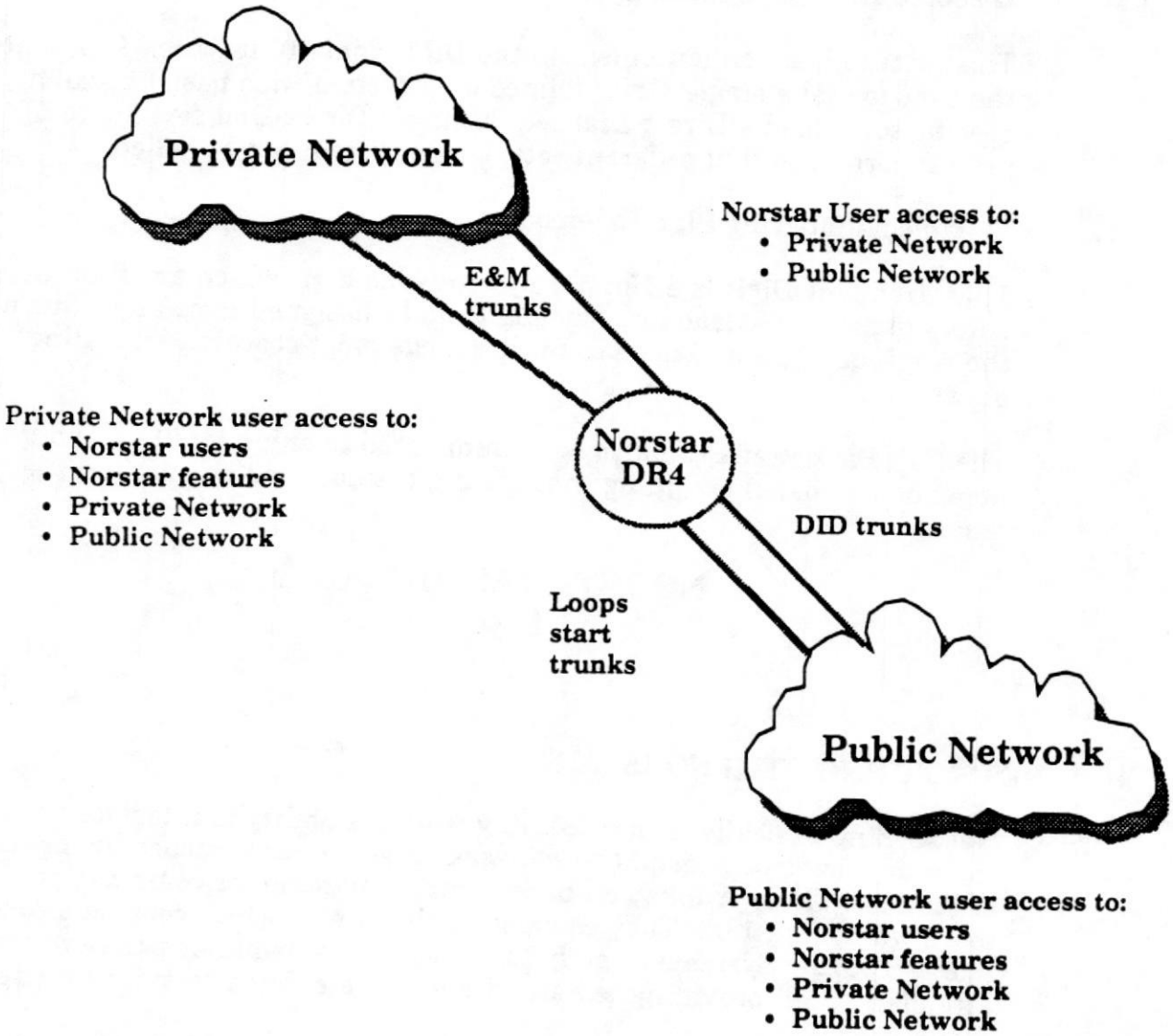


FIG 1.0

External transfer from Conference (Unsupervised Conference) permits the Norstar user to drop out of a conference involving two external parties leaving the others connected.

This feature is really an extension of "Transfer from Conference", which in DR3 or previous, required that at least one of the parties be internal to the Norstar system to at least monitor the conference.

- **Directed Dial - "0" Capability**

This feature is an enhancement to the DR3 "Dial - 0" feature. It permits the user to dial a single digit (defined on a system-wide basis) to call a specific set, called a Direct-Dial set. Multiple Direct-Dial sets (up to 5) are supported, so that different sets on one system can be called.

- **Flexible Numbering Plan Extensions**

The Attendant Digit is a Norstar system wide digit which a station user enters to call the attendant. The digit can be assigned to be any value in the range of 0 to 9 and none to facilitate customer coordinated dialing plans.

The Call Park Prefix can also be administered to any digit (0 - 9 and none: no call park) providing that the digit is not used by another feature.

NORSTAR MODULAR
DR4

NETWORKING WITH NORSTAR

Networking basically is the PBX/Key System's ability to interface with the public switched telephone network and/or other switches by means of trunks. These trunks can be incoming, outgoing, or combination (both ways) (Fig 1.0). They can also be tie trunks, which connect two or more PBX/Key Systems directly to station users, bypassing the system's attendants and providing enhanced and more efficient service for users.

Using three trunk types (E&M, DID, and Loop Start), Norstar fits into existing networks as
- an end-point (node) in the Private network
- a conventional main in the Public network

Typically, a trunk is a physical connection between switches in a network and a line is a physical connection between a switch and a device (eg. a telephone, modem, or fax machine).

ANSWER MODES

Norstar DR4 provisions for two trunk answer modes: (1) manual and (2) auto (Appendix 2, A. Configuration, 1. Trk/Line data, Trunk data, ans mode)

Manual:

- Manual Answer (loop start or E&M trunks) same functionality as DR3.
- Calls are made or received by going off hook.

Auto:

- Auto Answer mainly used for DID and E&M trunks.
- The Norstar system will answer the call and route it to a target line which is determined by the digit string received on that trunk.
- The auto setting is also used to configure Direct Inward System Access. (See DISA section for details.)

TIE TRUNKS - E&M SIGNALING

Tie trunks are special trunk circuits which interconnect, on a dialable basis, two or more PBX or Key Systems. Tie trunks are the arteries of a private network.

Signalling over tie trunks is generally of the E&M (Excipere & Mittere) type. In this configuration there are two or four "wires" used for signalling, as well as two or four "wires" for the voice path. The two signalling leads, the E-lead and the M-lead are not carried end to end as separate transmission facilities, but are multiplexed with the voice leads; logically, they can be considered to be independent of the voice, end to end. The C.O. E&M interface converts the voice and signalling information into a stream that is compatible with the transmission medium. The M-lead is for sending signals and the E-lead is for receiving signals.

The historic E&M lead signalling circuit uses only one lead for each direction of transmission. This means the current that flows between switching and signalling equipment must return over a common ground path (Fig. 3.0). It also means that the signalling leads have a greater noise influence than if the leads were balanced four wire (Fig. 3.1) as are transmission circuits. While the historic E&M signalling circuits operated satisfactorily in electro mechanical systems, they were not satisfactory for electronic switching systems. To differentiate between the two circuits, they are named TYPE I and TYPE II. The Type I circuit (Fig. 3.0) being the historic circuit used with electro mechanical systems and Type II circuit (Fig. 3.1) used with electronic systems.

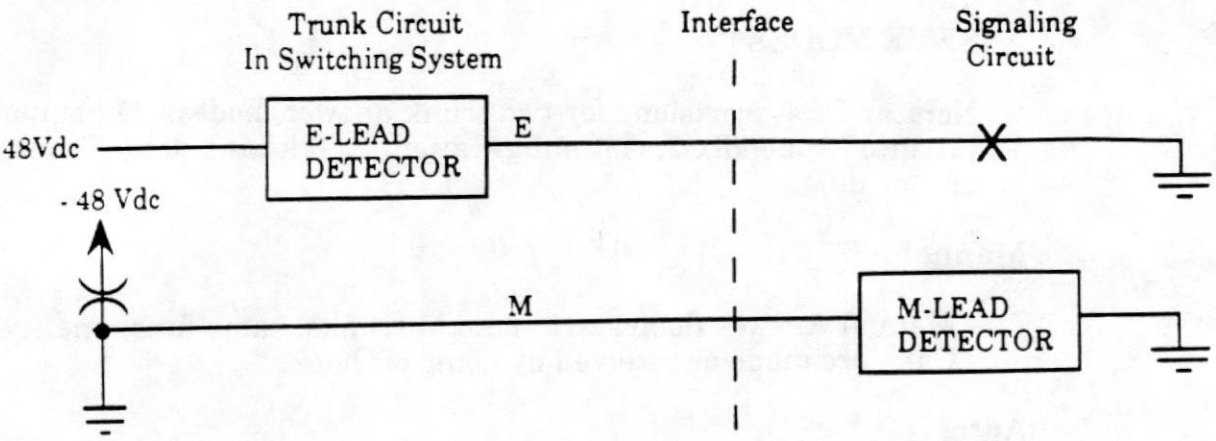


FIG 3.0

E&M Signaling - Type I

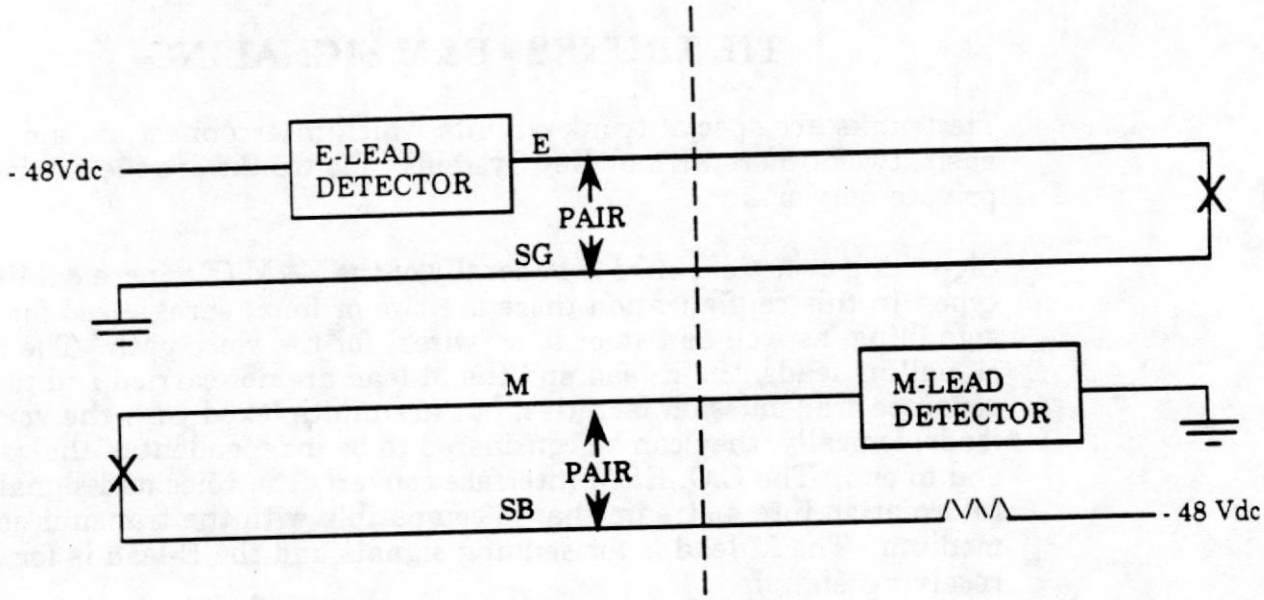


FIG 3.1

E&M SIGNALING - TYPE II

Type II circuits are the preferred arrangement of trunk interfaces in electronic switching environments. It is a 4-wire fully looped arrangement in which open and closure signals are used in each direction. Signalling from trunk circuit to signalling circuit is over the pair designated M, SB. The signalling circuit must supply -48V resistance protected battery on the SB lead and sense for the open and closure signals on the M-lead.

NORSTAR E&M TRUNKS

- **Definition**

E&M trunks are used to directly connect two or more systems in a private network (Fig. 7.0).

Two answer modes are supported in DR4: manual answer and auto answer. The answer mode (manual or auto answer) for each trunk determines the type of call treatment applied to the incoming calls on that trunk. (See Appendix 2, A. Configuration, 1. Trk/Line Data, Ans Mode).

The manual setting is used to directly alert a station(s) with a line appearance associated with the trunk (ring down).

The auto answer setting allows the trunk to be answered by the Norstar system. The Norstar looks at the digit string received on the trunk and makes a logical match by checking the received number (Appendix 2, A. Configuration, 1. Trk/line data, Line: 081 to 184, Received #). See Trk/line Mapping Concept.

Manual and auto answer E&M trunks can be used for making outgoing calls in the same way as outgoing calls are made in DR3.

- **Benefit**

E&M trunks allow direct communication between users on a private network at a reduced cost since companies are typically charged a flat rate, as opposed to a per usage charge.

- **End User's View**

To make an outgoing call, a station user on a Norstar system can access an E&M line either by selecting a key appearance of the line, or from a line pool, or by using the external line access code. The station user is immediately connected to the system at the other end and hears dial tone from that system.

For incoming calls on an E&M line to the Norstar system, if configured for manual answer, the Norstar will supply ring back to the far-end and ringing cadence to the station(s) in the system with an appearance of that line.

If the E&M is configured for auto-answer, the call is answered immediately by the Norstar system and dial tone is presented to the caller. The auto-answer E&M line can also be configured for Direct Inward System Access (DISA), whereby the Norstar system will present stuttered dial tone to the far end (see the DISA section for details).

- **Installation Details**

An E&M trunk cartridge is required to implement E&M connectivity. The E&M trunk cartridge is functionally integratable with current Norstar trunk cartridges and is inserted in the Norstar trunk module in the normal fashion (Fig 4.0).

The E&M trunk cartridge provisions for (2) E&M circuits.
NOTE: Maximum system configuration is reduced whenever an E&M cartridge is provisioned instead of a regular (4) circuit trunk card.

Physical wiring connections are shown in Fig 5.0. The Norstar E&M Type II requires all (8) leads to be connected. A transmission conversion unit (Voice Com or equivalent) could be used to convert Type I (6) wire to the required Norstar Type II (8) wire requirements.

The E&M trunk cartridge also provisions (2) additional DTMF receivers for use with loop start trunks. The DTMF receiver would be used if the loop start trunk was configured for DISA and auto-answer to decode the digit string (see the DISA section for details).

Fig 6.0 shows the wiring connections for two Norstar systems connected with E&M tie trunks.

Flexibility in choosing the type of supervision is provisioned such that Norstar can be configured to access all Central Office types (ie. analog and digital). (Appendix 2, A. Configuration, 1. Trk/Line Data, Signal - Options are; Wink Start, Delay Dial or Immediate Start)
NOTE: Match the Norstar signal type to the host C.O. or far end system in the case of two Norstar's connected.

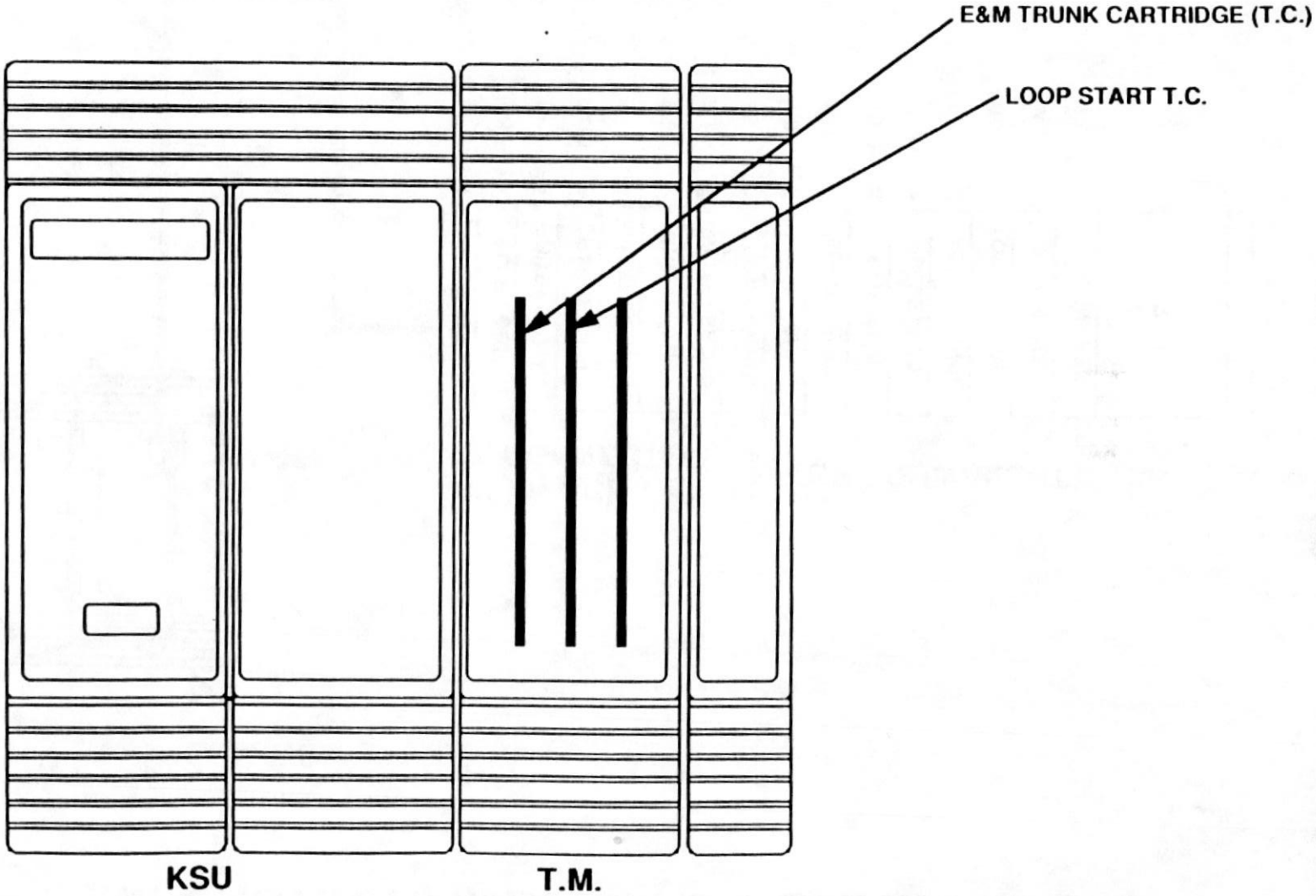
When configured for Immediate Start, the trunk is ready to register incoming dial pulses within 65 ms of C.O. seizure. Immediate start signalling uses "dial pulse" addressing only and would be used behind Step-by-Step C.O.'s (analog).

When configured for Wink Start, the trunk reverses battery and ground to the C.O. for 140 - 290 ms to indicate it is ready to receive address signalling.

Wink Start signalling is the default setting in Norstar and is commonly used behind Common Control C.O.'s (digital).

When configured for Delay Dial, the trunk reverses battery and ground towards the C.O. for >140 ms and until it is ready to receive address signalling, at which time it returns normal battery polarity to the C.O.. The battery reversal does not happen until 100 mS minimum and 150 mS maximum after receiving a valid incoming seizure signal from the C.O.

E&M TRUNK HARDWARE CONFIGURATION



- EACH E&M T.C. PROVIDES (2) E&M TRUNK CIRCUITS

FIG 4.0

E&M TRUNK HARDWARE CONNECTIONS

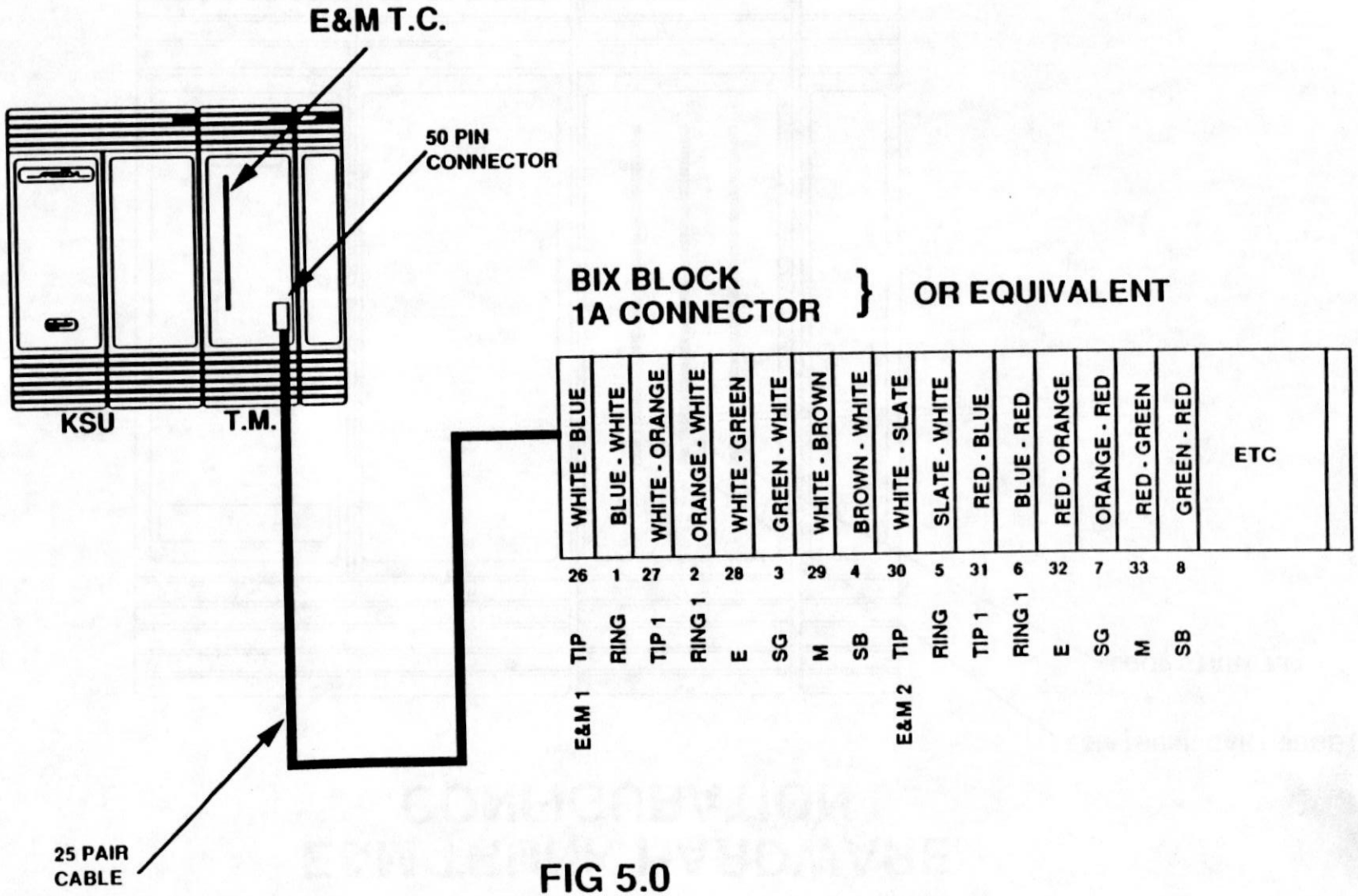
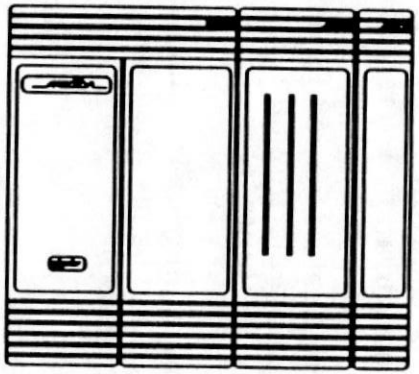


FIG 5.0

NORSTAR TO NORSTAR
VIA E&M TRUNK

NORSTAR SYSTEM A



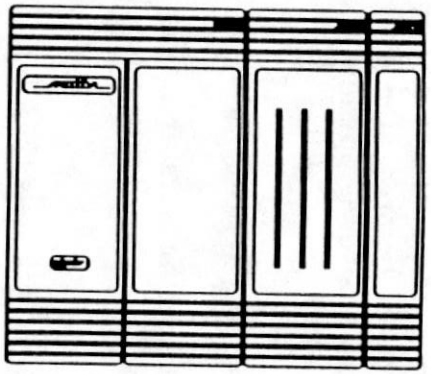
KSU T.C.

WINK START

E&M CONNECTIONS

T	T1
R	R1
T1	T
R1	R
E	SB
SG	M
M	SG
SB	E

NORSTAR SYSTEM B



KSU T.C.

WINK START

NOTE: THE SIGNAL TYPES SHOULD MATCH

FIG 6.0

- **E&M Tie Trunk Examples**

When a user from system A (Fig 7.0) accesses the tie line to Norstar system B, the user will be presented with dial tone from system B. when configured for auto-answer (Appendix 2, A. Configuration, 1. Trk/line data, Ans Mode, Auto).

The user now has the following options:

- dial directly to a specific Norstar station (Target line call). If the target line is busy, Overflow Call Routing would route the call to the prime set for that line

- dial the line pool access code for an outgoing tie line (if configured) to System C

- dial the feature code for the Norstar paging system.

If the tie line from system A to system B was configured for manual answer; the user would access the line as before, but all Norstar stations in system B with that line appearance would ring (operates as a ring-down tie line, or hot line).

Calls may also be made from Norstar system B to system A. Norstar system B users can:

- dial a line pool access code to select an outgoing line from an E&M line pool or
- select an E&M line on the station by pressing a line button.

NOTES:

1. When programming line pools, assign lines that have the same access to the same pool. In addition, each line pool should have only one type of line in it (that is, don't mix E&M lines with loop start in the same pool).

2. An E&M line may be configured as the prime line for a Norstar station (Appendix 2, A. Configuration 1. Trk/line data, line data, prime set).

3. When an E&M trunk is configured for manual answer (ring-down), the Norstar will not enable alerting until incoming seizure persists for at least 150 mS. This prevents "Glare".

4. E&M trunk cartridges may be installed in the same module as loop start or DID trunks and may be installed with Release 1 KSU's (A0357464/NT5B20FA-93).

E&M TIE TRUNK EXAMPLE

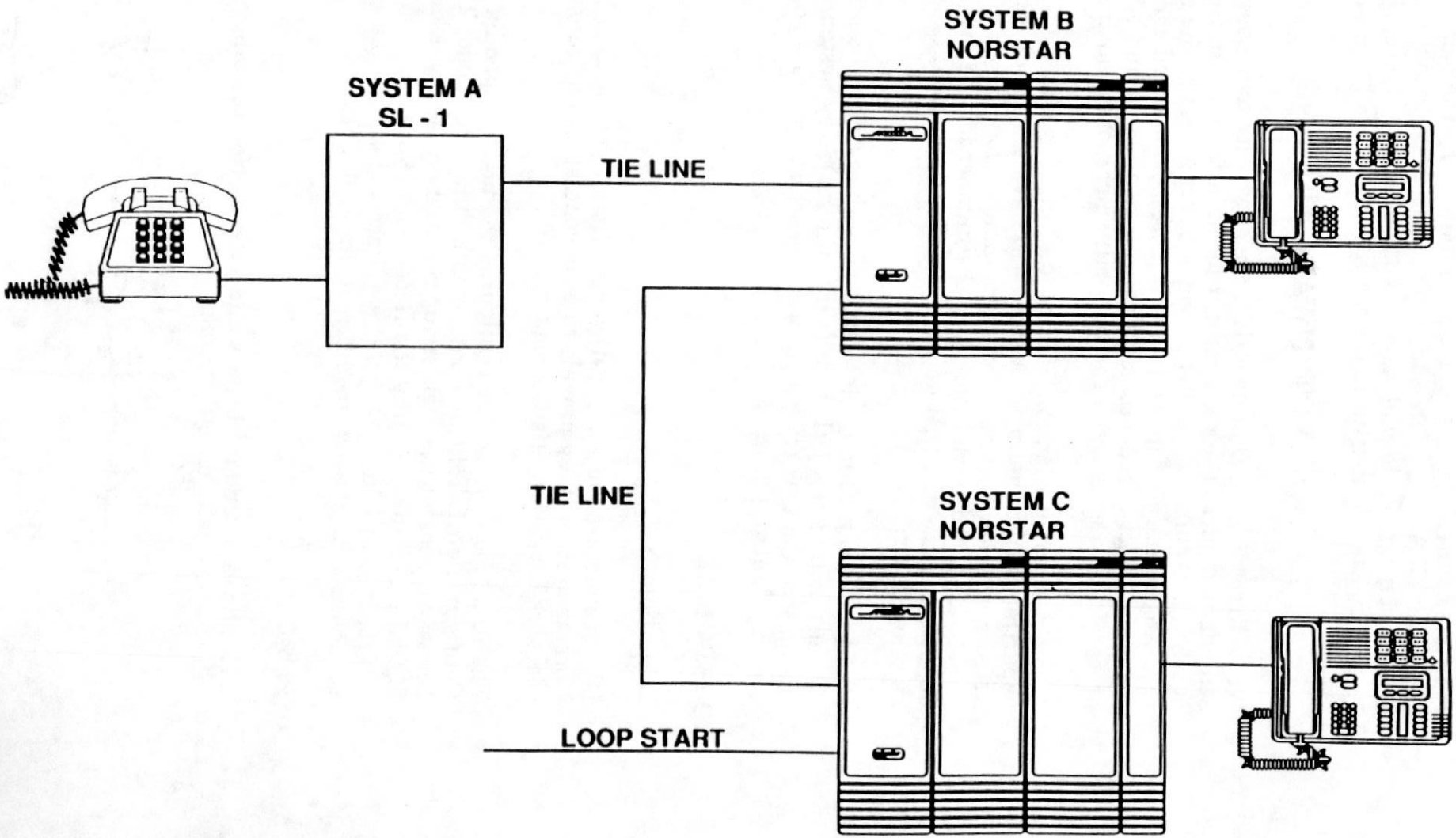


FIG 7.0

7 db
induces loss to compensate for 2/4 to facility with gain.

5. In instances where an E&M tie trunk is used between two Norstars not connected via a C.O., a gain could be induced by the Norstar system (Appendix 2, A. Configuration, 1. Trk/Line data, trunk data, gain). The default setting is "Normal" and the other setting is "High". The high setting injects a 7 db gain to the circuit.

DIRECT INWARD DIALING

With Direct Inward Dialing (DID), the capability to bypass the system's attendant reduces the requirement for an attendant, thus reducing overhead. Additionally, DID provides direct access to the called party resulting in the perception of much more personalized service. The combined effect is reduced costs with more efficient and effective call processing, a necessity in the competitive corporate environment.

A common application for DID is found in the yellow pages under department store listings. A store will have a main directory number listed and below will be seven digit numbers for many departments in the store. A caller who looked up the number for the furniture department can dial that department directly without talking with the store operator.

DID trunks can be much less expensive than Centrex service by concentrating a few DID trunks into the PBX/Key System rather than the normal Centrex offering of wiring each station to a port in the serving Central Office.

NORSTAR DID

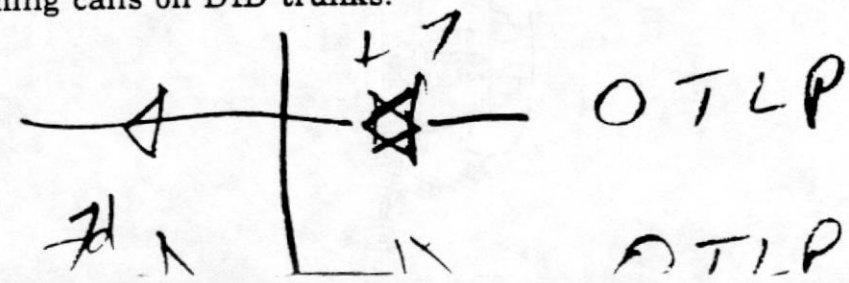
- **Definition**

  DID trunks are incoming paths only, from the central office to the Norstar system, they provide line concentration and must be supervised. (See Trk/Line Mapping Concept Fig 2.0).

  The Ans Mode "must" be configured to auto. (Appendix 2, A. Configuration,1. Trk/Line data, trunk data, Ans mode) This allows the Norstar to look at the digit string received on the trunk and make a logical match by checking the Received # (Appendix 2, A. Configuration, 1. Trk/line data, line: 0 8 1 to 1 8 4, Received #). If a match is made, the station(s) with the assigned target line will alert.

- **Benefit**

  DID allows attendant bypass and extends Norstar call coverage features to incoming calls on DID trunks.



- **End User's View**

An incoming DID call is routed to the required target line and alerts at every set with an appearance of that target line. The user answers the call as he does any other, by selecting the target line appearance, invoking off-hook call queuing, etc.

A user may also have a physical appearance of the DID trunk for monitoring purposes.

An outgoing call cannot be made on a line key associated with a DID trunk (physical appearance) or with a line key associated with the station's target line appearance.

- **Installation Details**

A DID trunk cartridge is required to implement DID connectivity. A DID trunk cartridge is functionally integratable with current Norstar trunk cartridges and is inserted in the Norstar trunk module in the normal fashion (Fig 8.0).

The DID trunk cartridge provisions four (4) DID trunk circuits. Physical wiring connections are shown in Fig 9.0.

- **CCI**

The CCI (Control Circuit Interface) connections provide an indication of the operation status of the DID trunk cartridge to the C.O.. When the CCI relay contact is open, it implies that the DID trunk cartridge is fully operational. When the CCI relay contact is closed (ie., short circuit across the CCI leads), this implies that the DID trunk is no longer capable of handling incoming calls. This relay state could be triggered by any of the following events:

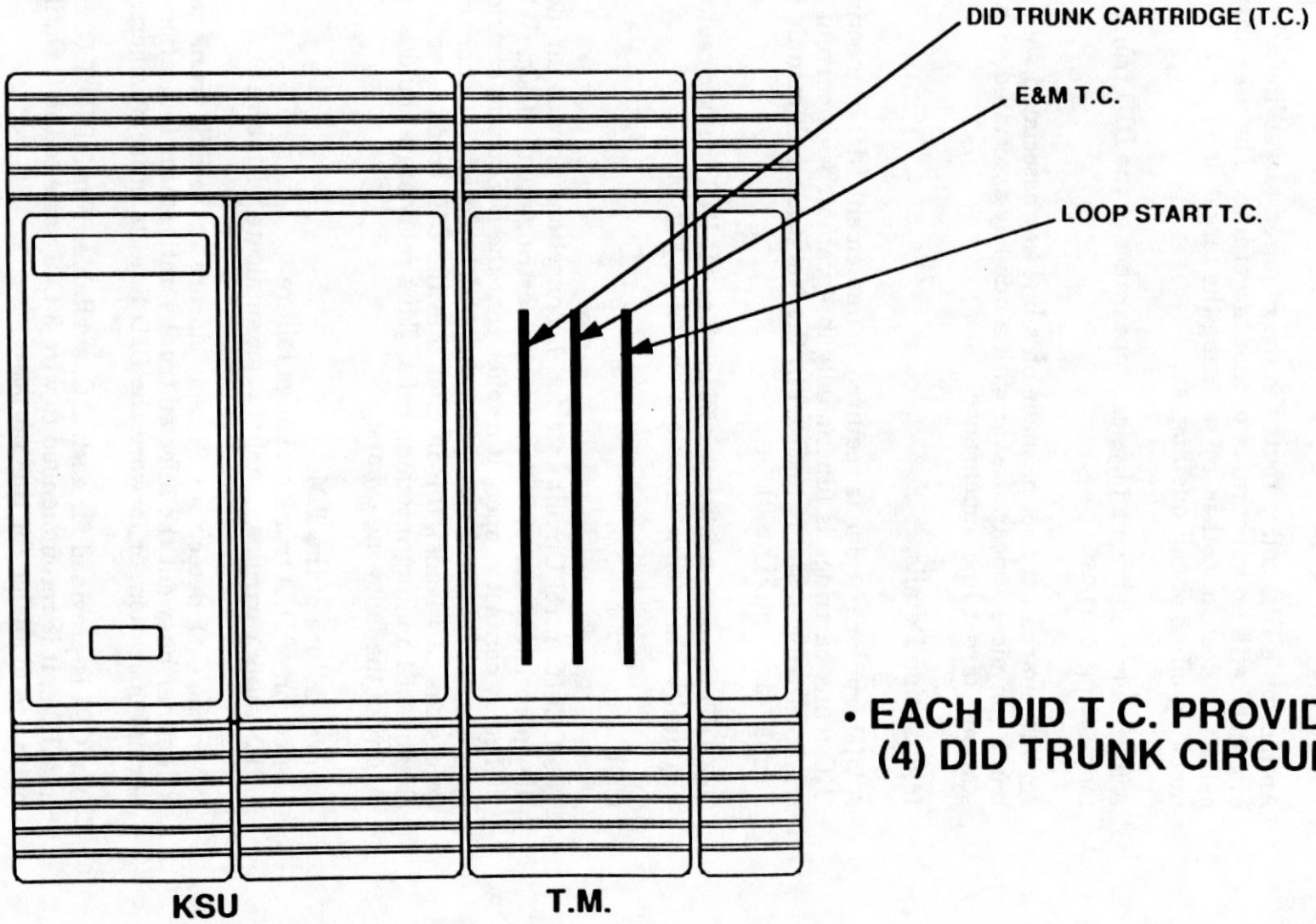
- power failure of the T.M.
- detection of DID trunk cartridge failure
- DID trunk cartridge unable to communicate with core

When the C.O. detects a CCI relay closure at the DID trunk cartridge, it will either busy out the affected trunks until status indication changes to normal operation, or forward the DID lines to other numbers.

One CCI is provided for each T.C. available. For 3 DID T.C.'s installed in a T.M., it is recommended to wire 3 CCI pairs to the C.O., if those pairs are available for this purpose.

The implementation provided here is, however, flexible enough to allow CCI pairs from multiple T.C.s to be connected either in parallel or in

DID TRUNK HARDWARE CONFIGURATION



- EACH DID T.C. PROVIDES (4) DID TRUNK CIRCUITS

FIG 8.0

DID TRUNK HARDWARE CONNECTIONS

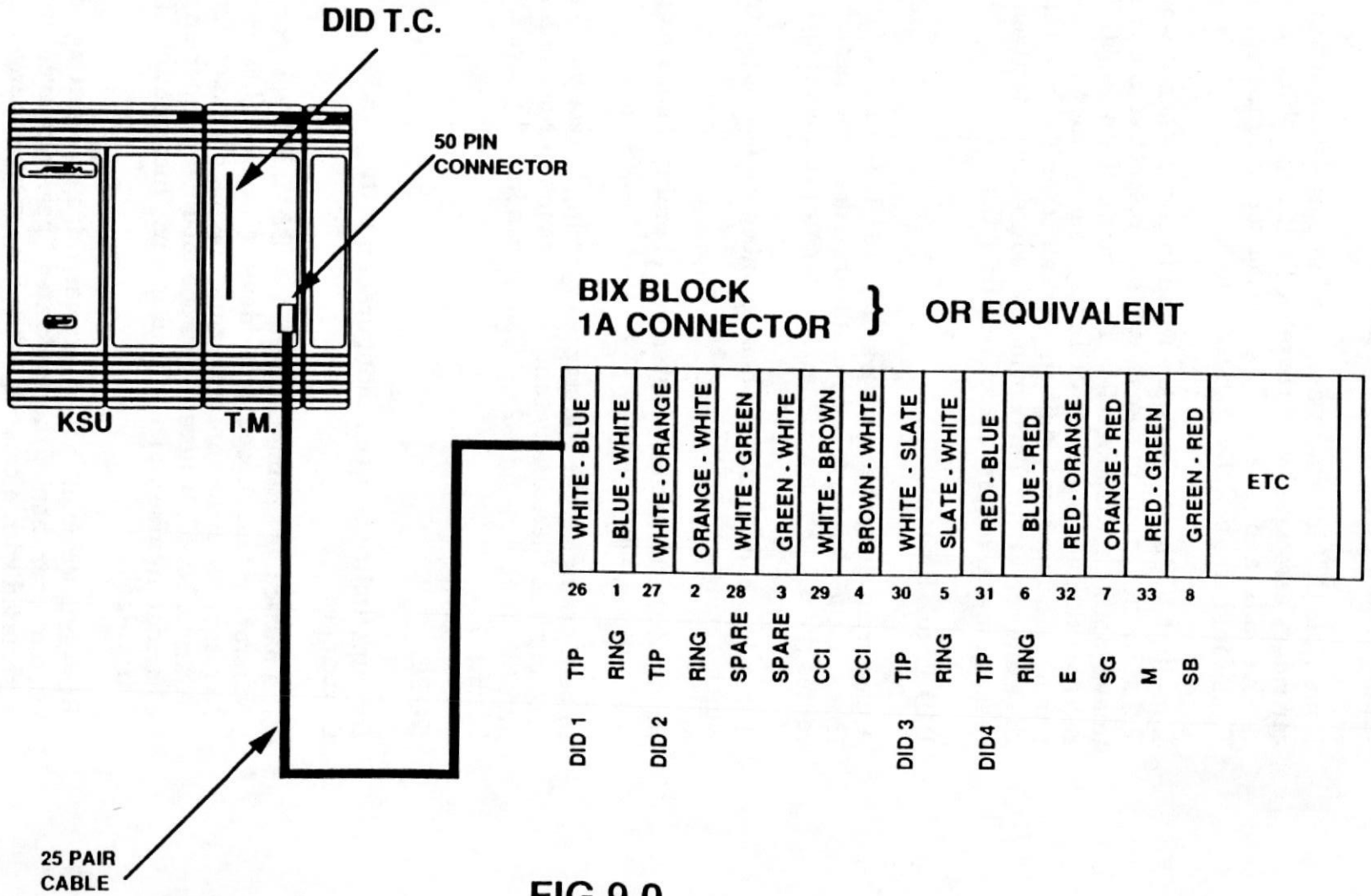


FIG 9.0

series combination "at the MDF" to minimize the number of pairs wired back to the C.O. It is important to note that in doing so reduces the validity of the CCI function as follows:

- If multiple CCI interfaces are wired in parallel, then any of the DID cartridges associated with those CCI's can signal its unavailability to receive calls, and take all T.C.'s out of service unnecessarily, since those T.C.s could still be fully operational.

- If multiple CCI interfaces are wired in series, then it would require "all T.C.s" in that group to signal (via their respective closed relay contact) unavailability to handle calls. Therefore, if a single T.C. is unable to receive calls, and closes its CCI relay contact, then the C.O. will be unable to detect this condition until all other T.C.'s in that group signal the same condition. This obviously reduces the effectiveness of the C.O. reassigning calls from defective DID T.C.s.

- **DID Trunk Examples**

  A user from the public network dials 763-1234. The C.O. selects a free trunk to the Norstar. The Norstar interprets the incoming digits and routes the call to the assigned Norstar target lines (Fig 10.0).

  In Fig 10.0 each DID "telephone number" is associated with a target line which appears on only one station.

  In Fig 11.0 a target line is assigned to multiple stations allowing more than one station to use the same DID "number".

  In both examples, the Norstar is expecting to receive (4) digits. The C.O. is configured therefore to send (4) digits to the Norstar and absorb the first (3). (See Appendix 2, A. Configuration, 5. System Data, Received Length.)

- **NOTE:**

  Incompatibility between configuration setting and actual Trunk Cartridge:

  - If a particular setting is selected ie; E&M, DID, or loop start and the Norstar system subsequently detects incompatible trunk hardware the Norstar will generate an alarm. The maintenance alarm will be "Alarm:62-X-Y", where "X" is the module number and "Y" is the cartridge number. The alarm means "Incompatible Trunk Cartridge".

  - Browsing through the various cartridge type settings doesn't affect the current operation of the associated lines. However, any lines that are associated with a cartridge that has its type changed during the

DID
One DID per Station

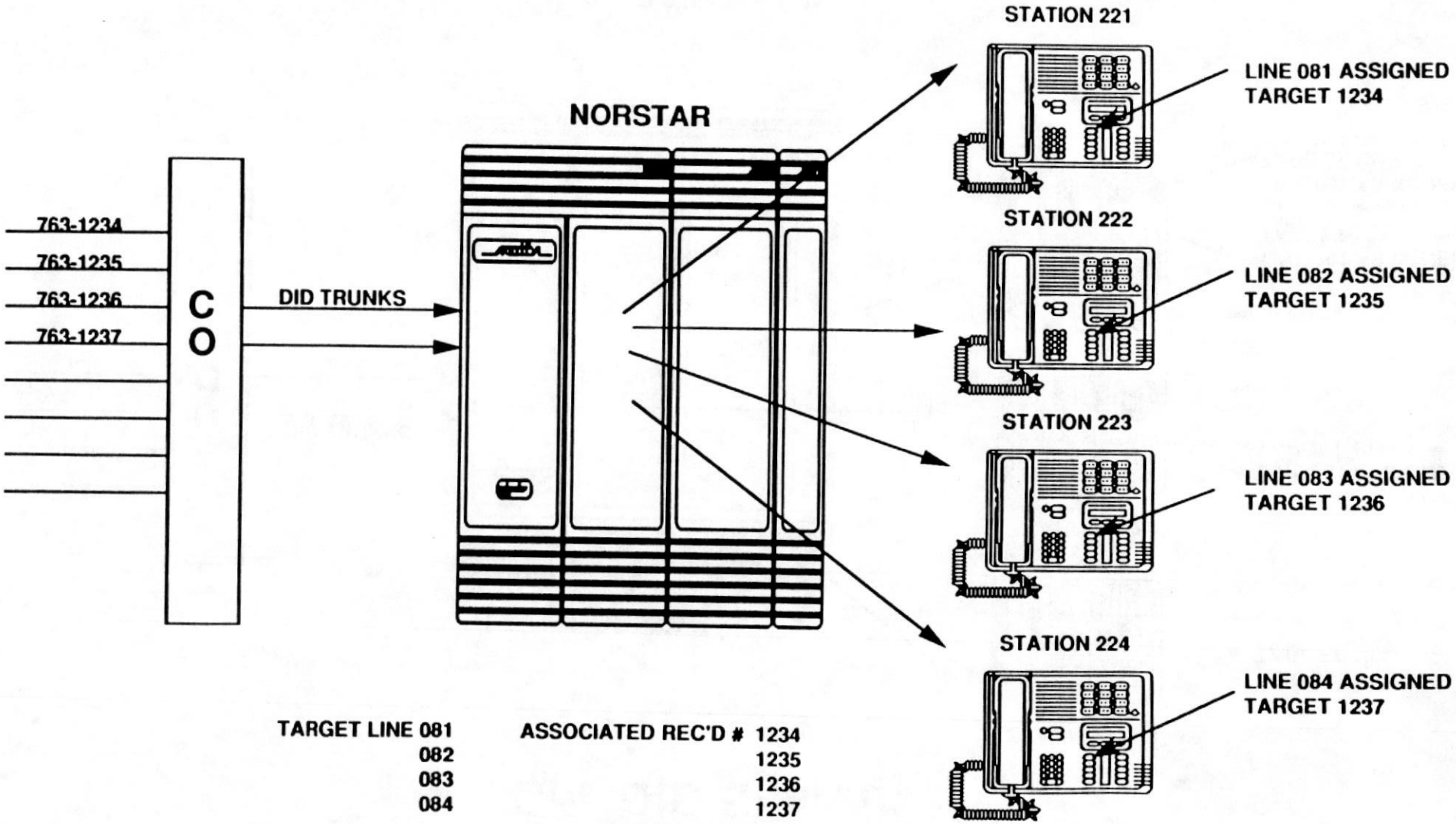
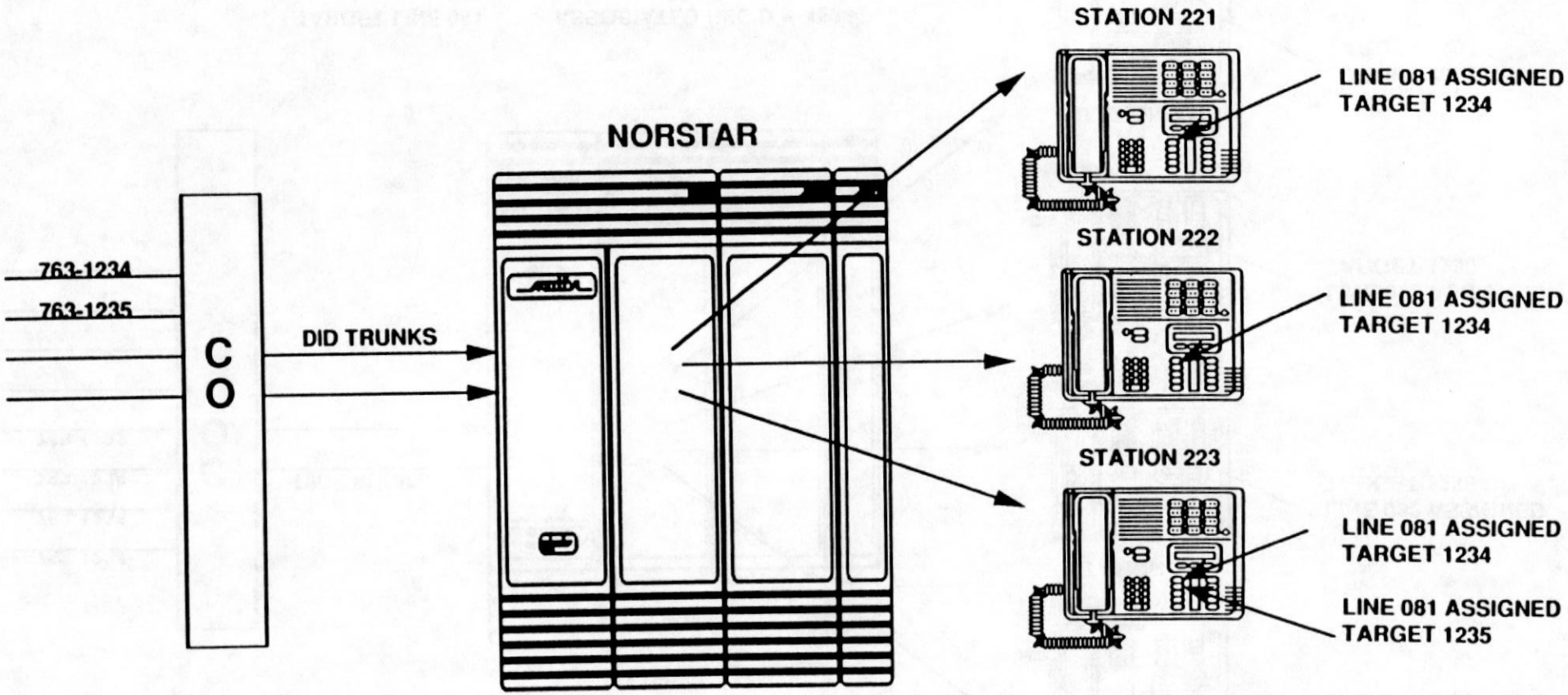


FIG 10.0

DID
One DID Shared



TARGET LINE 081
082

ASSOCIATED REC'D # 1234
1235

FIG 11.0

programming session will be disabled upon completion of the session and only re-enabled when the hardware installed is changed to match the new setting for the cartridge type.

A prime set may be specified for a DID target line. Existing call processing rules (DRT, etc.) would apply.

If a DID target line was in use when called, the Norstar would route the call to the prime set for that line.

DIRECT INWARD SYSTEM ACCESS (DISA)

DISA or remote access allows users elsewhere on the private or public network to call into a Norstar system and, once on that system, gain access to a subset of that system's resources.

Access to a private network from a set external to the system cost effectively enables that user to avoid long distance charges (Fig 12.0). Typical applications include sales persons or maintenance personnel. Further applications include allowing a Main Frame Computer to poll PC's at various branch locations after business hours.

Features and services typically available via DISA access are Internal Calls, Trunk Calls, and limited features of the Norstar system.

DISA is typically configured by assigning a special nonpublished number (trunk) which when connected to the Norstar system immediately answers upon detection of ringing.

NORSTAR DISA

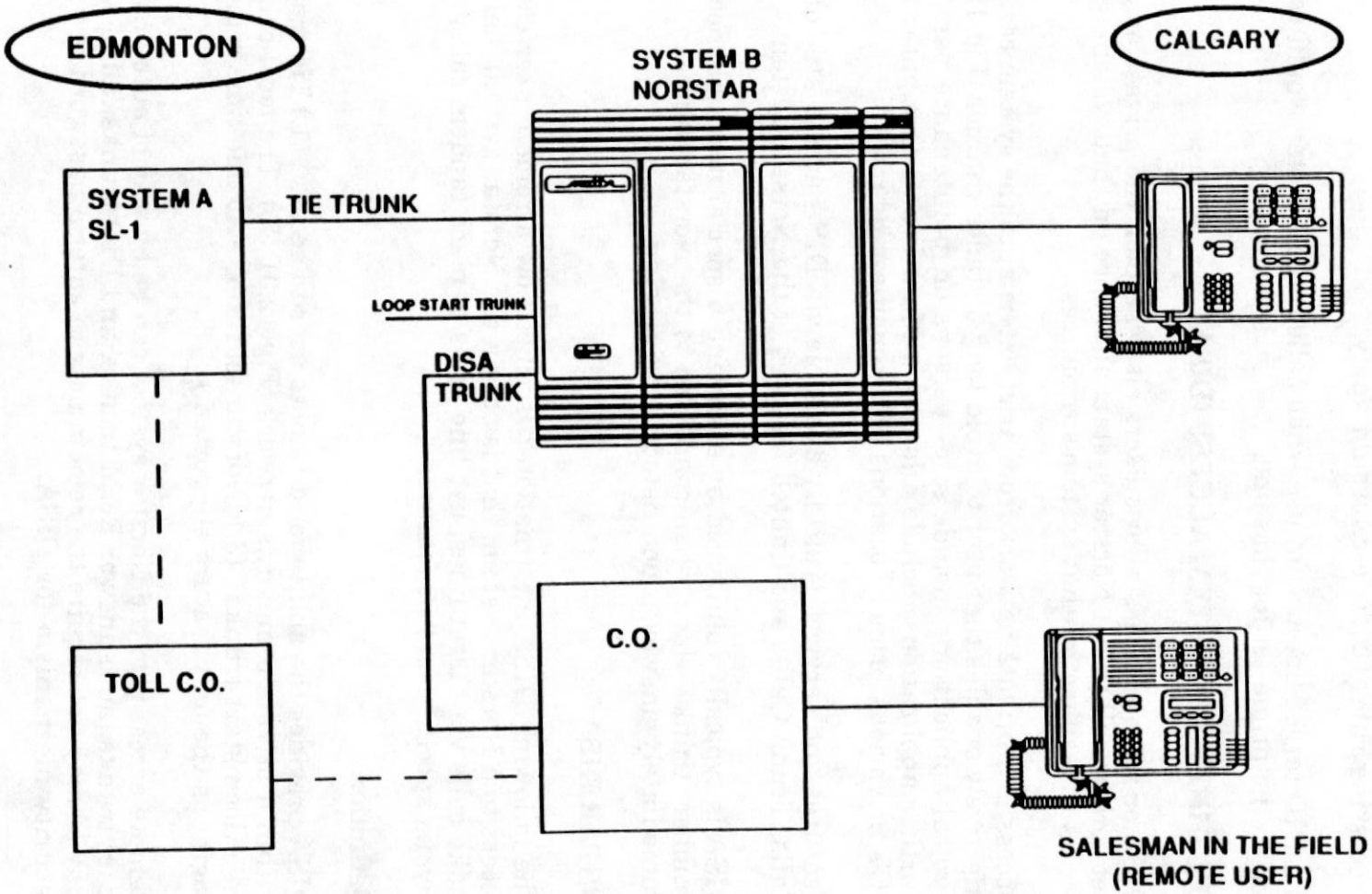
The following DISA information describes how a remote user can gain access to a Norstar system, that is obtain the Norstar system dial tone to make calls via target lines, use line pools to place tandem calls, and invoke specific Norstar features.

- **Definition**

DISA provides the ability for a remote user to access : (1.) Tie trunks within a private company's network (Fig 12.0), (2.) The local calling area (loop start trunks), (3.) Norstar features. (At this time remote paging is the only feature supported.)

Remote access into the Norstar system can be by way of auto-answer loop start trunks, auto-answer E&M trunks, and DID trunks, all of which may or may not require the remote user to enter a password to pass the security mechanism for DISA.

DISA



The Salesman can use DISA to provide access to the Norstar system, then use an access code to GAIN access to the SL-1 system, rather than use the Public Network and incur toll charges.

FIG 12.0

- **Benefit**

  DISA provides a mechanism which permits people away from the office to make use of Norstar facilities (private network) and features (paging) remotely, bypassing the normal toll costs associated with using the public network.

- **End User's View**

  When a remote user wants to access a Norstar system, the user would dial the number (via the public network) or select the trunk (private network) that is configured to answer automatically with DISA (Fig 13.0).

- **Installation Details**

  The Norstar provides DISA access via an auto-answer E&M trunk or DID trunk. This is accomplished by programming a "DISA DN" (Appendix 2, A. Configuration, 4. Miscellaneous, DISA DN:). A remote user dials the "DISA DN" digit string into the Norstar on a DID or E&M trunk. The Norstar makes a logical match and will return stuttered dial tone, requesting Class of Service (COS) password access to the system (Fig 14.0).

  COS replaces DR3 and earlier Restriction passwords. The COS passwords may still be used with F68 as Restriction Override passwords.

  COS passwords are programmed in Appendix 2, B. Administration 5. Capabilities, (new DR4 term), COS Passwords, Set Abilities.

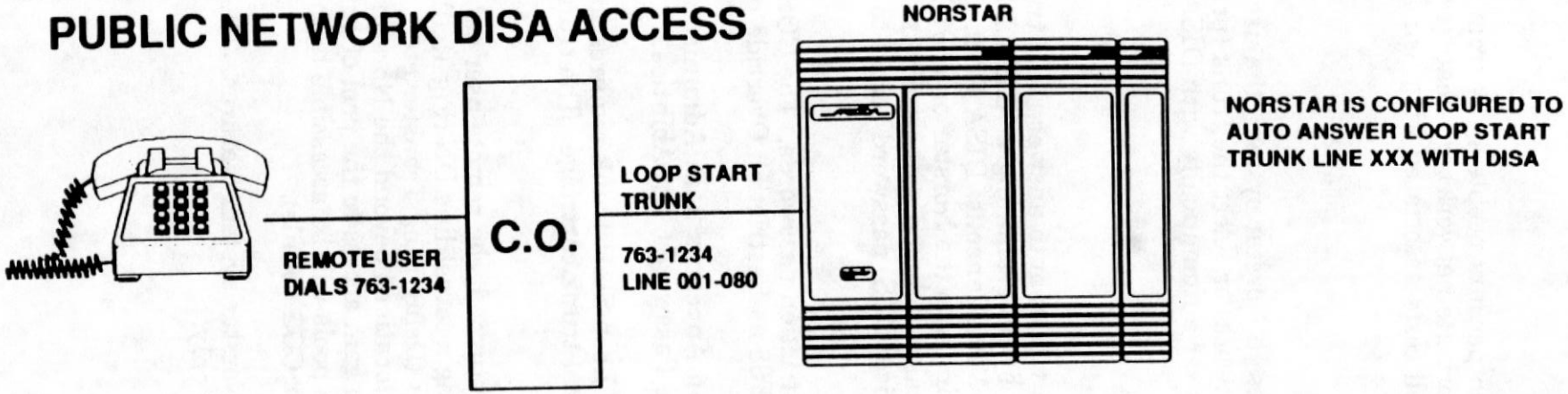
  Remote Access via an auto-answer Loop Start trunk requires the use of a DTMF receiver provided by the E&M trunk cartridge. The trunk must provide disconnect supervision.

  Once Norstar system dial tone is returned, the remote user can make calls to target lines by simply dialing a target line DN (Fig 15.0). The call will follow the call processing rules (Delay Ring Transfer etc.). The remote user can also "Tandem" to locations beyond the Norstar system by dialing a line pool access code to gain access to the pool of outgoing lines. The COS dictates which line pools will be accessible to the remote user (see Enhanced Restrictions for COS details).

  The remote user may also invoke Norstar system features. The initial release of DR4 will support paging only.

DISA ACCESS

PUBLIC NETWORK DISA ACCESS



PRIVATE NETWORK DISA ACCESS

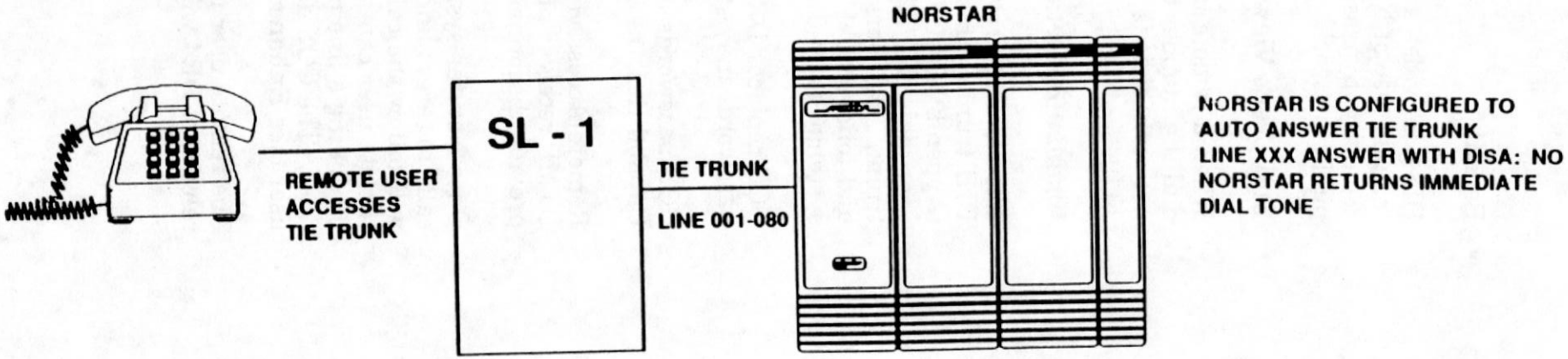
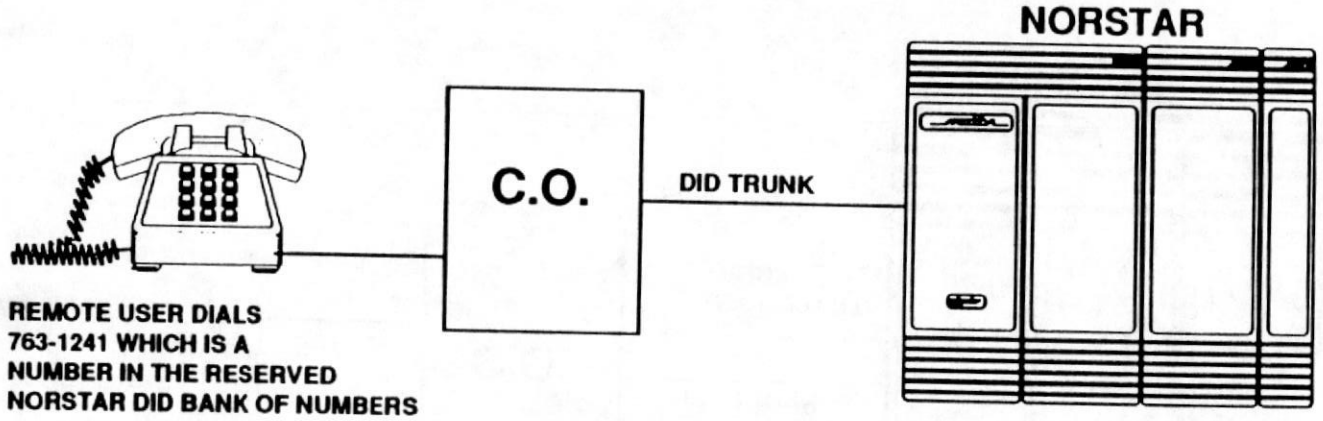


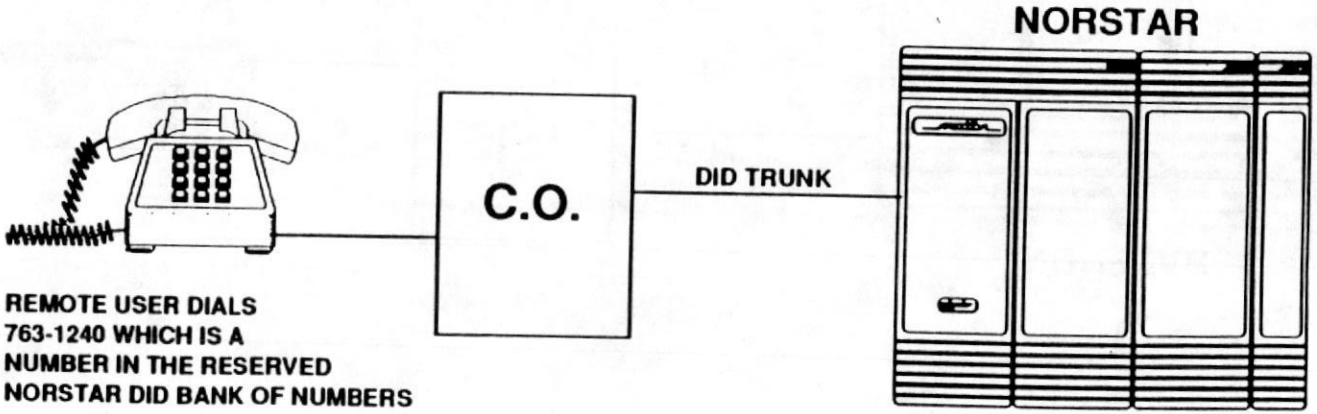
FIG 13.0

DID DISA



A. CONFIGURATION
4. MISCELLANEOUS
AUTO DN: 1241

NORSTAR WILL MAKE A "LOGICAL" MATCH AND RETURN IMMEDIATE DIAL TONE

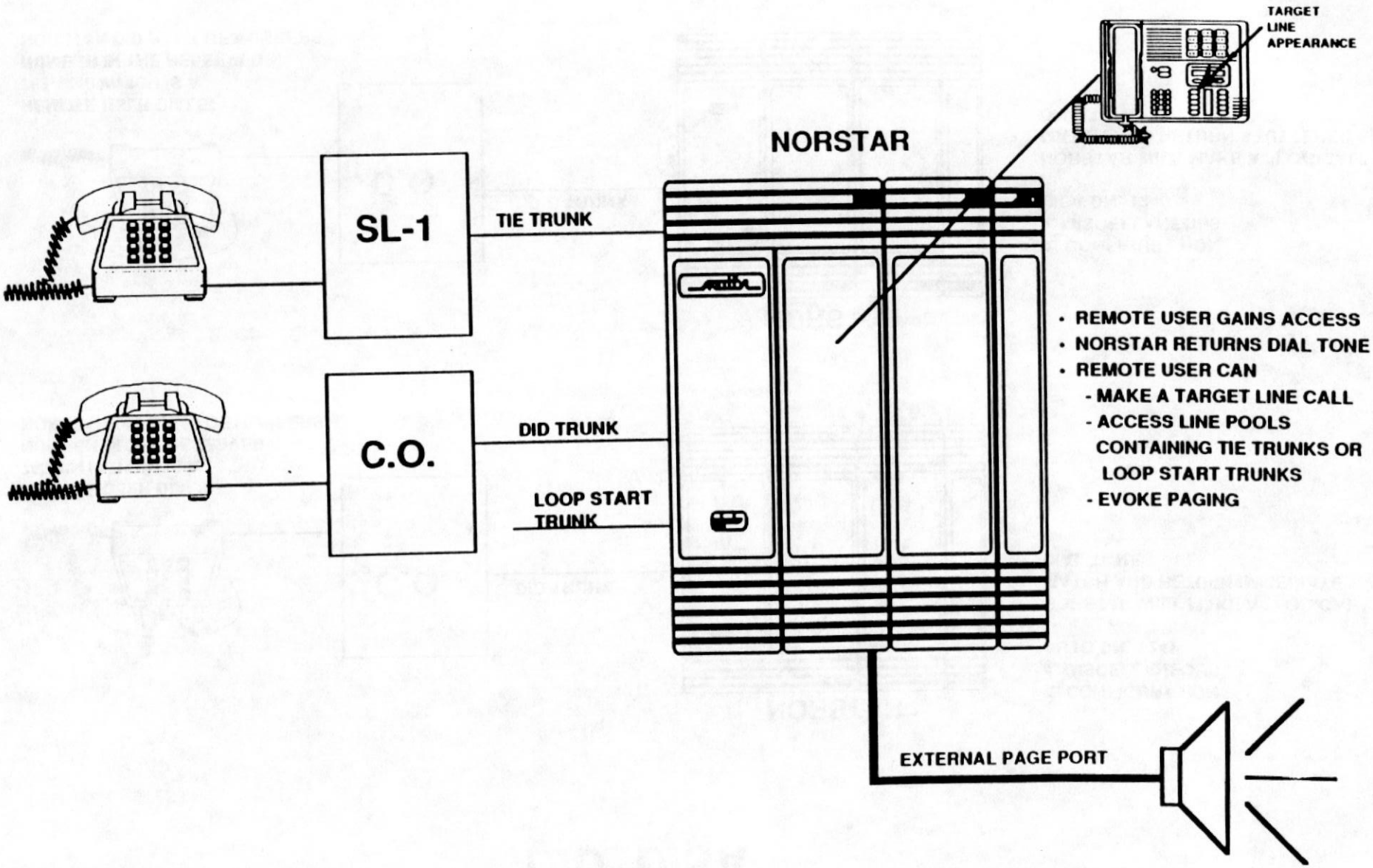


A. CONFIGURATION
4. MISCELLANEOUS
DISA DN: 1240

NORSTAR WILL MAKE A "LOGICAL" MATCH AND RETURN STUTTERED DIAL TONE

FIG 14.0

DISA ACCESS



- REMOTE USER GAINS ACCESS
- NORSTAR RETURNS DIAL TONE
- REMOTE USER CAN
  - MAKE A TARGET LINE CALL
  - ACCESS LINE POOLS CONTAINING TIE TRUNKS OR LOOP START TRUNKS
  - EVOKE PAGING

FIG 15.0

NOTE:

Remote access to the Norstar via an E&M tie trunk may be configured to return immediate dial tone rather than stuttered dial tone. The need for a security mechanism (stuttered dial tone with password access) is usually not an issue within a private network.

Instead of using the "DISA DN:" for stuttered dial tone access, the remote user would use the "Auto DN:" to return direct Norstar system access without a password. (Appendix 2, A. Configuration, 4. Miscellaneous, Auto DN:)

An E&M, DID or Loop Start Trunk could be dedicated to DISA use by programming the auto-answer trunk to answer with DISA (Appendix 2, A. Configuration 1. Trk/Line Data, Trunk Data, Ans with DISA). Once the trunk is seized, the Norstar system provides stuttered dial tone requesting COS password entry.

NORSTAR ENHANCED RESTRICTIONS

- **Definition**

DR3 and earlier restrictions and overrides have been reworked to provide enhanced functionality in conjunction with the new trunking options (E&M Tie Trunks, DID, DISA).

DR4 Enhanced Restrictions introduces a new term - "Exceptions" which replaces overrides.

In the past, two separate restriction and overide tables were maintained. DR4 replaces the separate tables with Filters (new DR4 term). A Dialing Filter contains restrictions and associated exceptions.

A Dialing Filter may be applied to (1)lines, (2) sets (3) a line on a set or (4) COS.

- **Benefit**

The DR4 rework of restrictions and overrides focuses on providing an easier method for administering restrictions, which can be applied to particular levels of service provided to a user.

- **Installation Details**

Dialing Filters are configured in "Capabilities" and each filter is comprised of restriction and exception entries. Both types of entries are programmed to the same table (Fig 16.0).

DIALING FILTERS
EXAMPLES

B. Administration
5. Capabilities
Dialing Filter

Dialing Filter 00: Unrestricted (Filter is unchangeable)

<u>Dialing Filter 01:</u>

Restriction 01: 1	Exception 001: 1-819
	002: 1-514
Restriction 02: 0	Exception 001: 0-819
	002: 0-514

<u>Dialing Filter 02:</u>

Restriction 01: 1	Exception 001: 1-613
Restriction 02: 0	Exception 002: 0-613

<u>Dialing Filter 03:</u>

Restriction 01: 1	Exception 001: 1-403
	002: 1-306
Restriction 02: 0	Exception 001: 0-403
	002: 0-306

<u>Dialing Filter XX</u>
Restriction 01:

↓

Restriction 48:
(Maximum)

Dialing Filters 01, 02, & 03 contain 16 entries which leaves a balance of 384 entries to be used in other Filters.

FIG 16.0

After defining a grouping of restrictions and exceptions (Dialing Filter), the filter can now be applied to (1.) Set (Appendix 2, B. Administration, 5. Capabilities, Set Abilities, Set Filter (2.) Line on a set) (B. Administration, 5. Capabilities, Set Abilities, Line/set filter). (3.) An External line (Appendix 2, B. Administration, 5. Capabilities, Line Abilities, Dial Filter), or (4.) as part of a class of service definition (Appendix 2, B. Administration, 5. Capabilities, COS passwords).

DR4 supports a maximum of 100 Dialing Filters, (indexed from 00-99). Within one Filter a maximum of 48 restriction entries are allowed (Fig 16.0). There is no limit on the number of exception entries for a given restriction other than the total sum of the number of restrictions & exception entries for all filters must be less than or equal to 400.

- **Example**

Fig 17.0 shows how the Dialing Filters can be applied. In the example, Dialing Filter 01 from Fig 16.0 has been applied to the set (Set Filter), Dialing Filter 03 has been applied to line 1 (Line Abilities), and Dialing Filter 02 has been applied to the Line/Set Filter for line 5 of the set. Only one filter can be assigned to a line, set, or line on a set.

REMOTE ACCESS FILTER APPLICATIONS

- **Definition**

Filters can also be programmed to restrict Remote users to a particular level of service.

If a Remote User was to gain Access to the Norstar System by using "DISA", the Norstar would return stuttered dial tone. This is a request to the Remote User to enter a Class of Service (COS) password which has been defined in Norstar programming (Appendix 2, B. Administration, 5. Capabilities, COS Passwords). Using the Filters, different levels of Remote Capabilities may be configured.

- **Benefit**

Remote Users, (eg. Sales, Warehouse and the President) require different levels of service. This is accomplished by defining COS Passwords associated with appropriate capabilities.

- **Example:**

A Remote User dials the trunk associated with DISA and is returned stuttered dial tone. The user dials in his COS Password and now has the defined capabilities. (Example uses Filters from Fig 16.0).

ENHANCED RESTRICTIONS

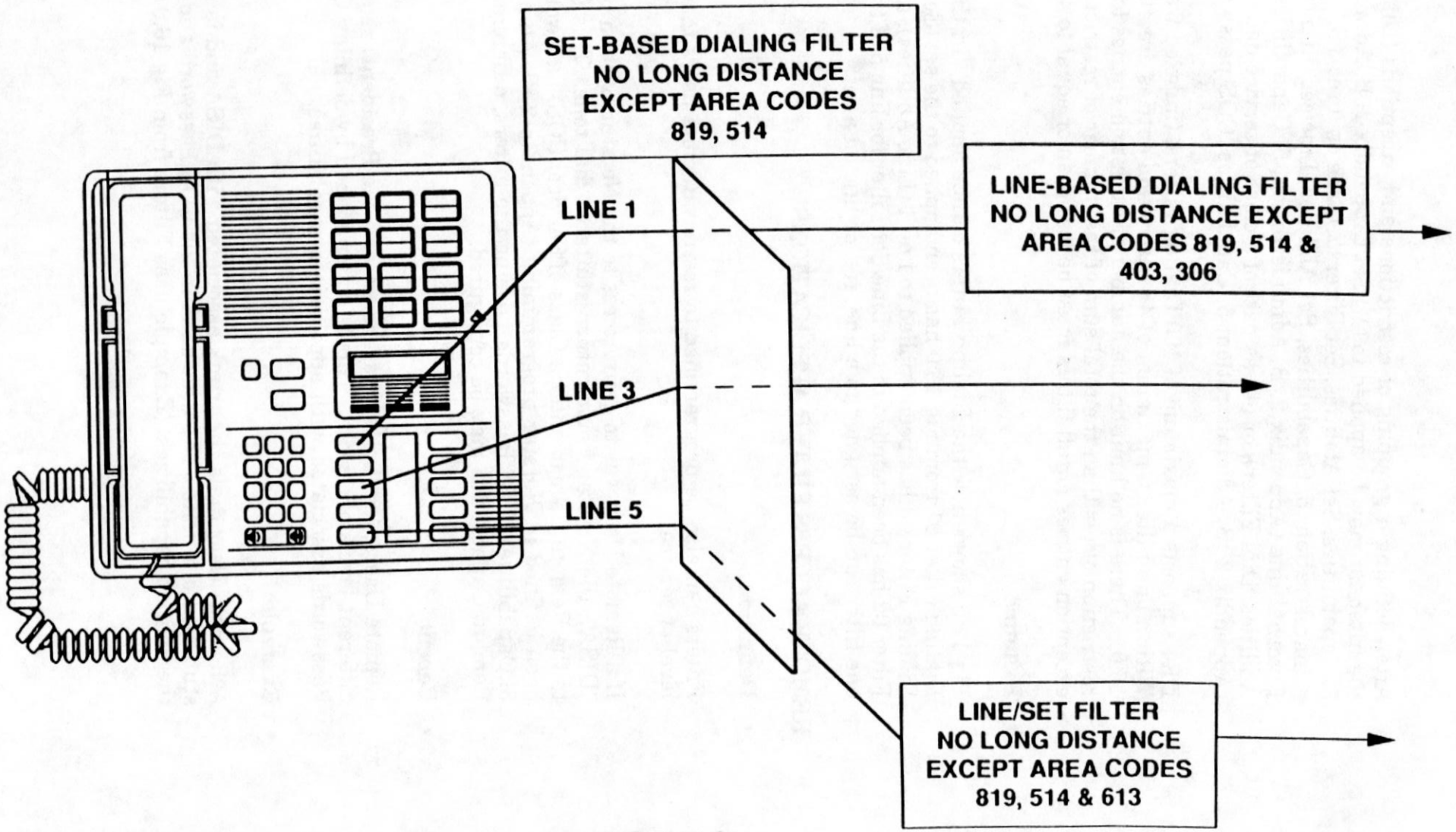


FIG 17.0

B. Administration
5. Capabilities
COS Passwords - 02 (6 digit Password)
USER FILTER: 01
LINE FILTER: 03
REMOTE PKG: 01

The Remote Package assigned to COS 02 is defined in 5. Capabilities, REM Access Pkgs, and determines to which line pools or features the Remote User has access.

B. Administration
5. Capabilities
REM ACCESS PKGS
REMOTE PKG 01
LINE POOL: POOL A
POOL B
REMOTE PAGE: YES

In this example, the Remote User (Fig 18.0) has access to Line Pool A & B and remote paging, but is restricted to long distance except area codes 819, 514, 403 and 306.

NOTES:

With DR4, the number of Line Pools has been increased from 9 to 15. Since it is desirable to assign E&M trunks (Tie lines) to a line pool, the total number of line pools has been increased to accommodate this requirement. Line pools are referenced by the first 15 letters of the alphabet.

SELECTIVE LINE REDIRECTION (External Call Forward)

- **Description**

The Selective Line Redirection feature allows any user to redirect incoming calls of one or more external lines to external (only) destinations. Redirection can be performed for any lines with assigned appearances at the Norstar station being used. A redirect ring (ring Splash) may be programmed as a reminder at any ringing appearances of the line that the line has been redirected.

- **Benefit**

Calls may now be redirected to destinations external to the Norstar. Calls at night time could be forwarded to an Answering Service or a branch office attendant could have all incoming calls forwarded to head office.

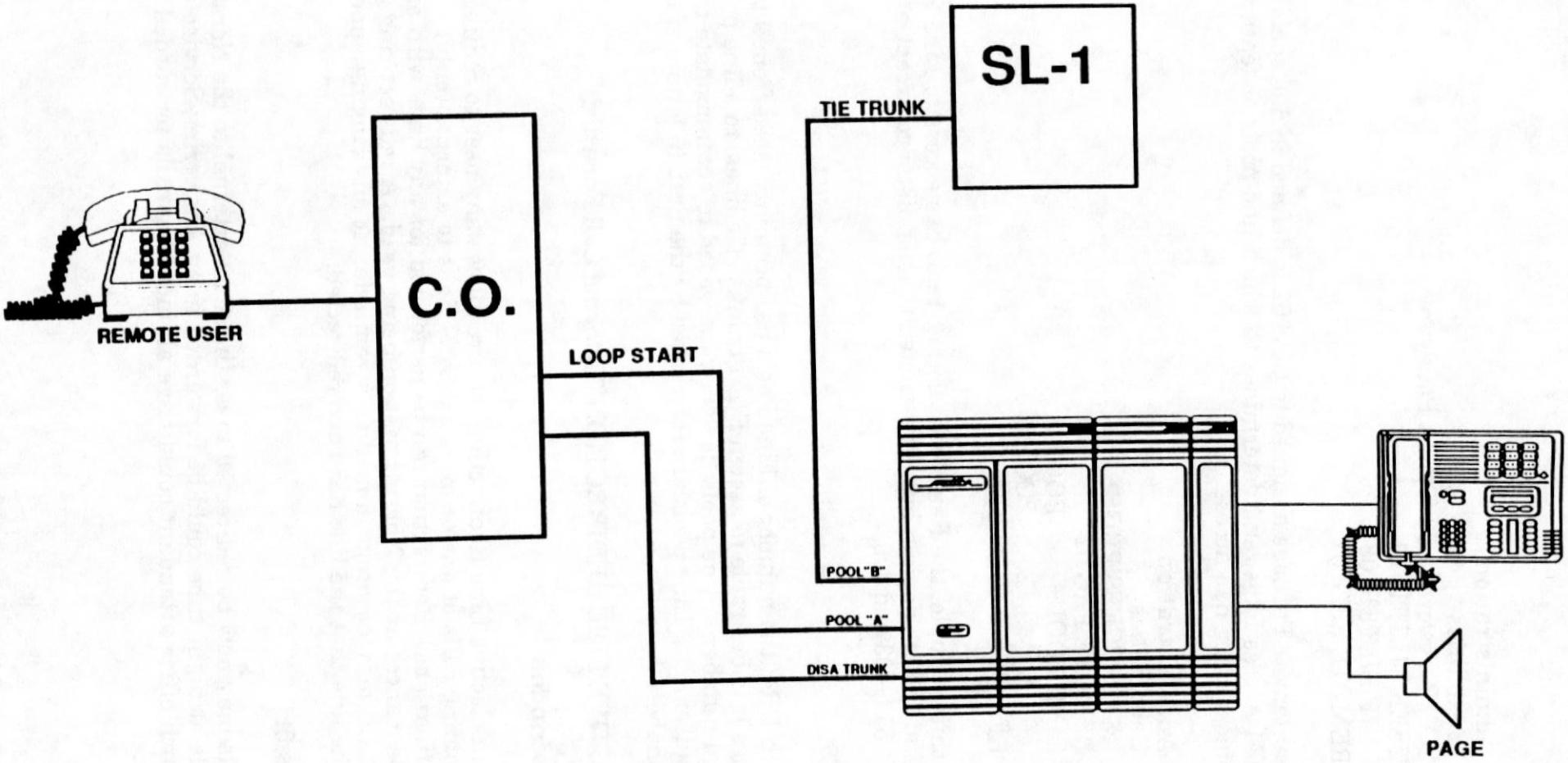

SL-1
TIE TRUNK
C.O.
REMOTE USER
LOOP START
POOL "B"
POOL "A"
DISA TRUNK
PAGE

FIG 18.0

- **Feature Details**

  In order to be redirected, the incoming line(s) must have disconnect supervision. Once a line is redirected, any calls arriving on that line can not be answered anywhere within the system. Only one user may be active specifying lines to redirect, and their destinations at any one time. Lines may be redirected to external destinations only. Redirecting (ring splash; a 200 mS burst of ringing) may be programmed to sound at every station with a ringing appearance of the redirected line. (Appendix 2, B. Administration, 5. Capabilities, Set Abilities, Redirect Ring)

- **End Users View**

  External Line Redirection re-routes all incoming (external) calls, including target lines, to external destinations. While a call is being redirected by the Norstar, the two line key indicators involved (incoming and outgoing) appear solid. When a call is not being redirected on the line, the line is available for normal outgoing use.

  The general procedure is (1) invoke the feature, either by pressing Feature 84 or a programmed key (2) select an outgoing facility (line or line pool) (3) enter the external destination phone number (4) press the line(s) to be redirected (or press the "All" soft key).

  To cancel redirection, the user would press Feature #84.

- **Example**

  Fig 19.0 and 20.0 show different External Line Redirection Applications.

UNSUPERVISED CONFERENCE (External Transfer from Conference)

- **Definition**

  This feature enables a Norstar station to conference two external destinations together and, upon disassociation from the call, allow the two external lines to remain connected.

- **Benefit**

  Conference calls are often established with two lines external to the Norstar system. External Transfer allows the Norstar user to disassociate from the call while the two external lines remain connected. This results in an increase of efficiency for the Norstar user such that when finished participating in the conference, may drop out and let the external parties remain connected. This means the Norstar user that has dropped out does not have to monitor the external parties; when they are finished disconnect supervision will drop the lines.

SELECTIVE LINE REDIRECTION

- Allows incoming calls on a line to be redirected over another line to a private network destination

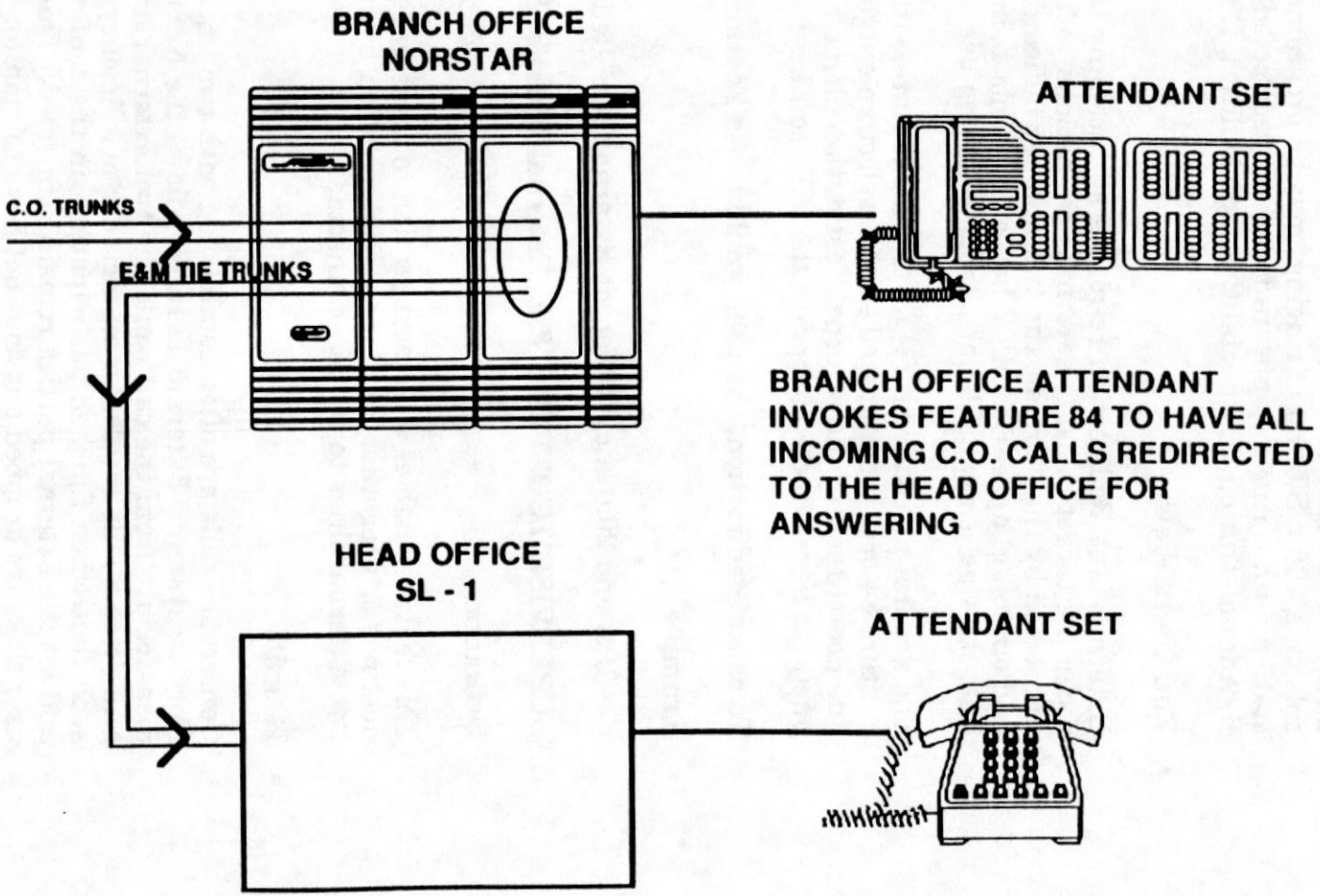


FIG 19.0

SELECTIVE LINE REDIRECTION

- Allows incoming calls on a line to be redirected over another line to a public network destination

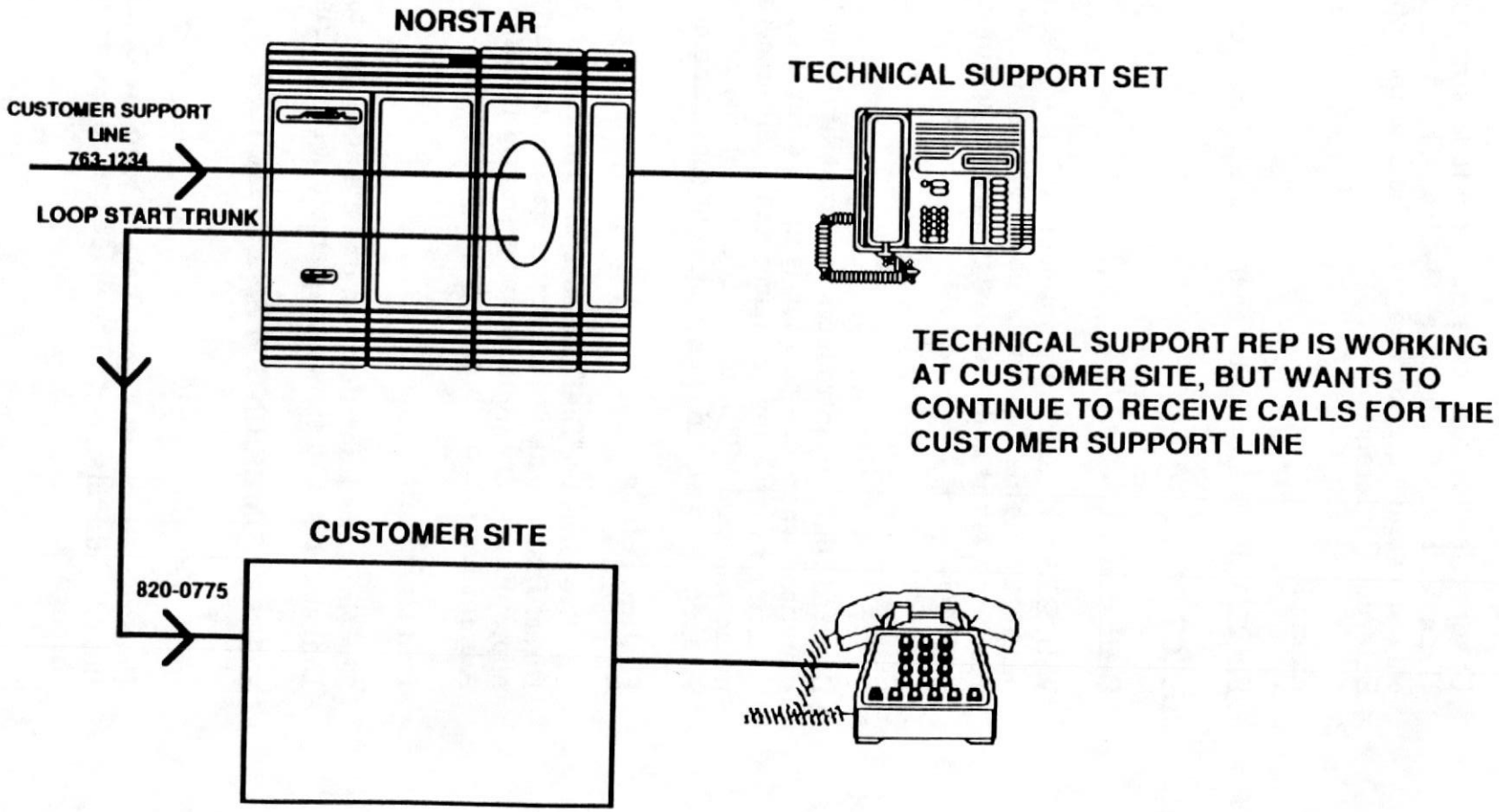


FIG 20.0

- **End User View**

  Unsupervised conference is intended to look no different from the "Transfer From Conference" feature. The "Transfer" soft key appears only in a valid situation and gives the user the opportunity to make an External Conference.

- **Example**

  Fig 21.0 shows a typical scenario for an Unsupervised Conference.

DIRECT DIAL - "0"

- **Definition**

  With DR3 and earlier, the number of Dial - "0" sets are restricted to one per system. This limit is increased to five. Coincident with this capability, is the ability to assign each station in the Norstar system to any one of these Dial - "0" sets.

- **Benefit**

  Directed Dial - "0" introduces the capability to de-load attendants in situations where one position is insufficient to meet the demand resulting in lost calls or unacceptable call processing. The increased number of Dial - "0" sets provides the ability to assign dedicated attendants to an office environment consisting of several departments.

- **Feature Details**

  The five Direct - "Dial" sets are programmed in Administration, 4. Direct-Dial. To assign a Norstar station to a particular Dial - "0" set, the appropriate entry would be programmed in Direct Dial: (Appendix 2, B. Administration, 5. Capabilities, Set Abilities, Direct Dial:).

- **End User View**

  The Norstar station user can dial a single digit to call an assigned Direct Dial set. Fig 22.0 shows an example of Direct Dial usage.

FLEXIBLE NUMBERING PLAN EXTENSIONS

- **Definition**

  Both the Attendant Direct Dial - "0" and the Call Park Prefix code can be flexibly Administered. The value can be programmed toe "NONE" and 0 through 9.

UNSUPERVISED CONFERENCE

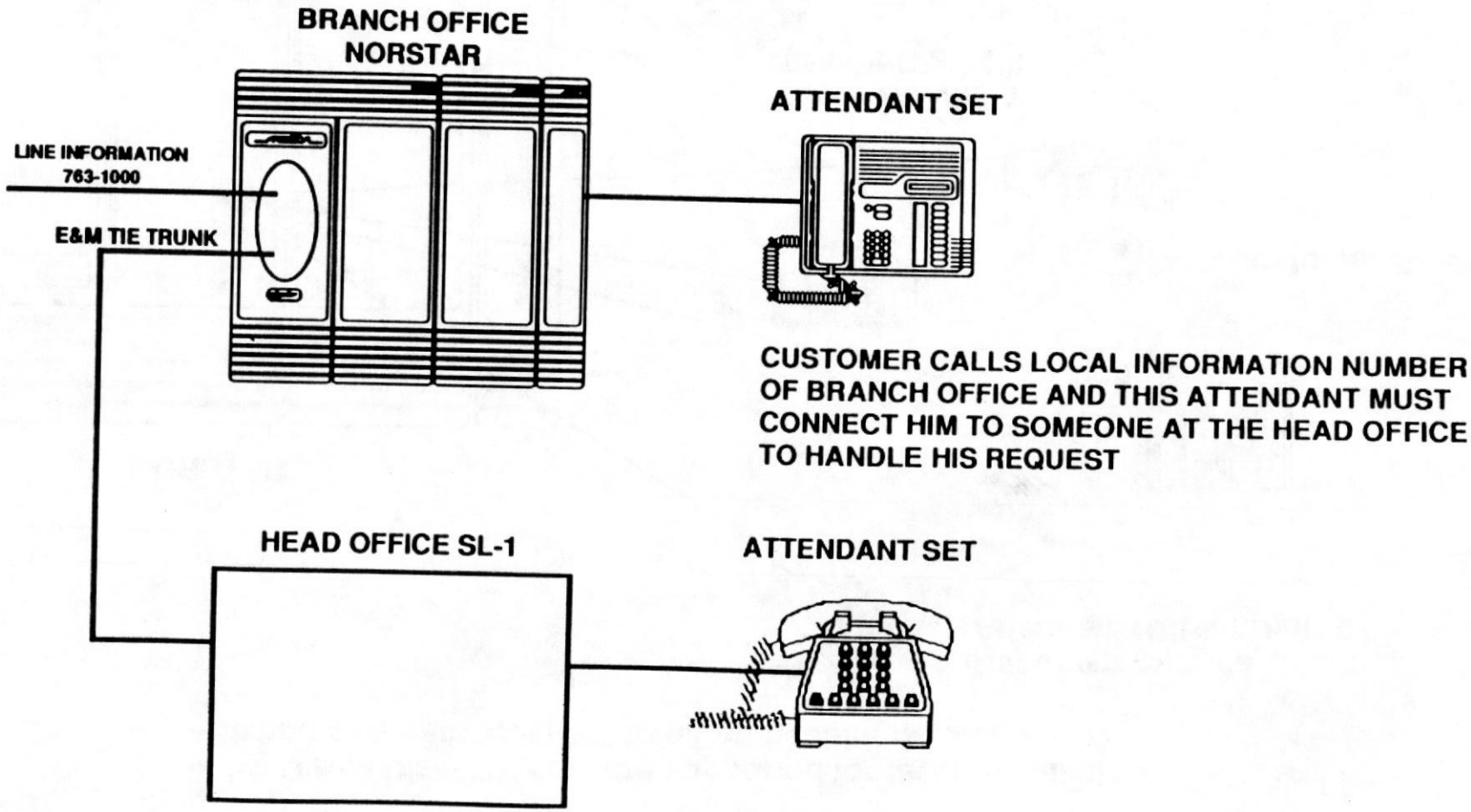


FIG 21.0

DIRECT DIAL - "0"

- Five Direct Dial - "0" sets are supported for layer installation
- Station sets can direct "0" to different destinations

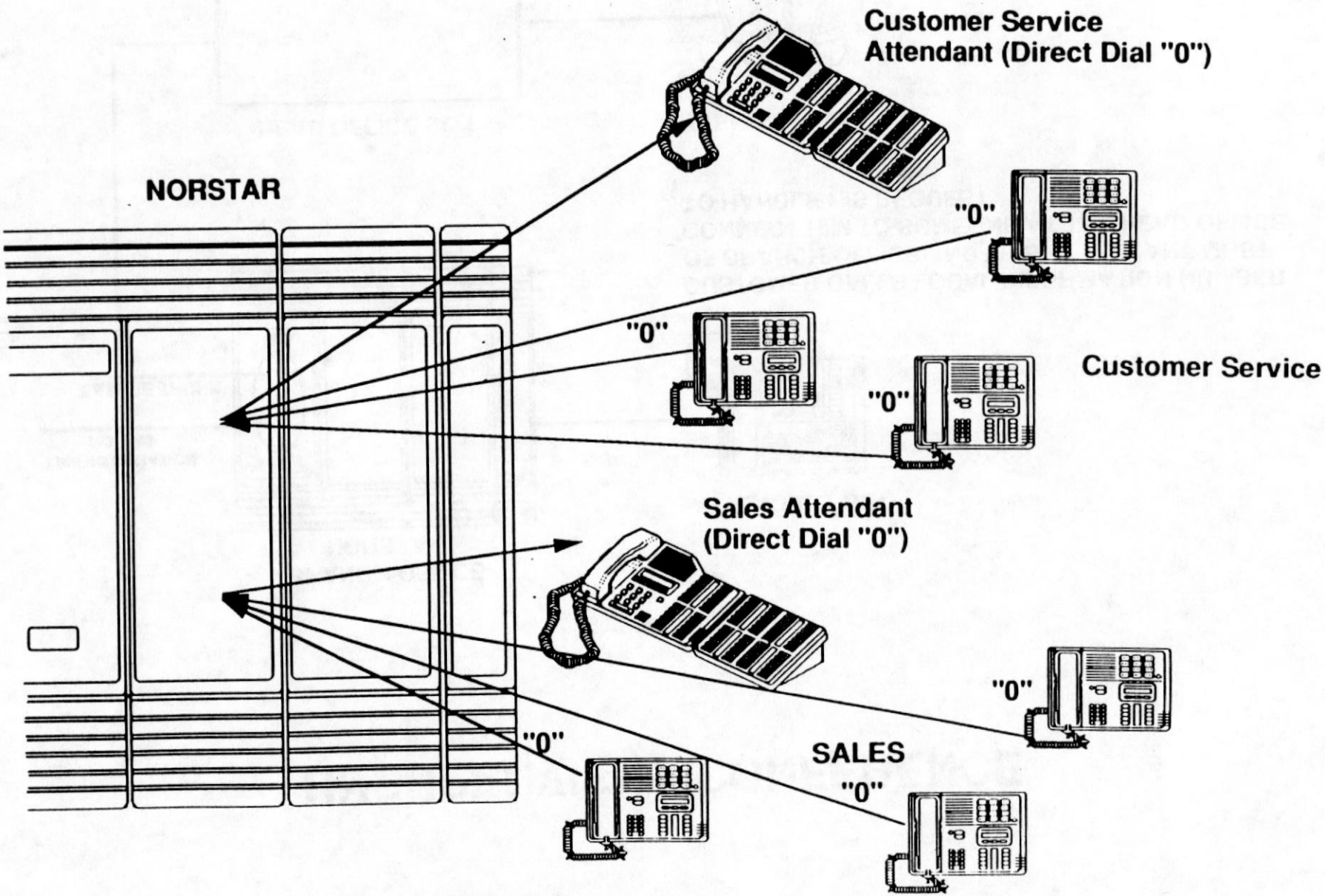


FIG 22.0

- **Benefit**

  An administrable code can be used to avoid conflict with other features accessed via the numbering plan, such as line pool access codes and DNs.

- **Feature Details**

  The Attendant Digit is defined on a system wide basis in Configuration (Appendix 2, A. Configuration 4. Miscellaneous, Direct-Dial#:).

  The Call Park prefix is defined on a system wide basis in Configuration (Appendix 2, A. Configuration, 3. Call Handling, Park prefix).

INSTALLER DETAILS

- Modular DR3 to DR4 software upgrade

  - single step upgrade procedure
  - no loss of programming except for restrictions

- Modular DR2 to DR4 software upgrade

  - Two stage upgrade procedure

  1. Upgrade Modular DR2 to DR3
  2. Upgrade Modular DR3 to DR4

  - no loss of programming except restrictions.

Norstar Programming Overview — Appendix 1 — Modular DR3 — Date Ma

I.T.A.S., Business Products Division, Calgary, Alberta

A. Configuration

1. Line Data — *Show Line (1 to 80)*

- Type — Public / Private to:(any DN#) or Pool:(1to9)
- Trunk mode — Super / Unsupr
- Dial mode — Pulse / Tone
- Aux. Ringer — Yes / No
- Full AutoHold — No / Yes
- Auto privacy — Yes / No
- Prime Set — 221 / (None or any DN #)

2. Line Access — *Show Set (DN)*

- Line Assignment — 1 to 80 / ADD or REMOVE Lines
- Answer DN's — (None or any DN #) / max. 4 Answer DN's/set
- Ringing Lines — Lines & Answer DN's:Ring or No Ring
- Pool Access — None / Pool 1 to 9:No or Yes
- Intercom keys — 2 / 0, 1, 3, 4, 5, 6, 7, 8
- Prime Line — None / I/C, Pool, Line (If Assigned)

3. Call handling — *Show*

- Hold Reminder — No / Yes
  - Remind Delay [if HLR = Yes] — 60 sec. / 30, 90, 120, 150, 180
- DRT To Prime — Yes / No
  - DRT Delay [if DRT = Yes] — 3 rings / 1, 2, 4, 5, 6
- Trnsfr Callbck — 3 rings / 4, 5, 6, 12
- Park Timeout — 45 sec. / 30, 60, 90, 120, 150, 180
- Camp Timeout — 45 sec. / 30, 60, 90, 120, 150, 180
- Directd Pickup — Yes / No
- On Hold — Tones / or Music or Silence

4. Miscellaneous — *Show*

- Backgrnd music — No / Yes
- Dial-0 Set — 221 / (None or any DN #)
- Alarm set — 221 / (None or any DN #)
- CAP assignment — CAP 1 to 5: (None) / (any DN #)
- Link Time — 600 ms. / 100 to 1000 steps 100
- Set relocation — No / Yes
- Hoot delay — 1000 ms. / 200 to 2000 steps 200
- Supervision — 480 ms. / 60, 100, 260, 600
- External Code — 9 / 0 to 9 (as available)
- Line Pool Codes — 1:xxxx / Pool 2 to 9 (4 digits max.)
- Installer Pswd — CONFIG max 6 digits

5. Change DNs — *Show*

- Individual DN's — Old DN: (any DN #) / New DN: (any DN #)
- DN Length [default 3 chars with expansion] — 2 Char's / 3 to 7 Char's

B. General Admin

1. System Speed Dial — *Show (1 to 70)*

- Number — No Number (max. 24 digits)
- Use prime line — Use line, pool code
- Display digits — Y / N
- Name — No Name / 16 Char's
- Bypass rest'n — N / Y

2. Names — *Show*

- Set names — *Show set (DN)* / max. 7 chars
- Line names — *Show line (1 to 80)* / max. 7 chars

3. Time & Date — *Show*

- Time — HH : MM
  - *Change* — Hour HH; Minutes MM
- Date — DD MMM YY
  - *Change* — Year YY; Month MM; Day DD

4. Restrictions — *Show*

- Table Entries — 1 to 30 (8 digits)
  - *Show*
- Applied to Lines — *Show line (1 to 80)*
  - *Copy from: to DN:* — Restriction N or Y
- Applied to Sets — *Show set (DN)*
  - *Copy from: to DN:* — Restriction N or Y

5. Overrides — *Show*

- Table Entries — 1 to 10 (14 digits)
  - *Show*
- Applied to Lines — *Show line (1 to 80)*
  - *Copy from: to DN:* — Override N or Y
- Applied to Sets — *Show set (DN)*
  - *Copy from: to DN:* — Override N or Y

6. Permissions — *Show Set (DN)*

- Locked — None / Partial or Full
- Full Handsfree — No / Yes
  - Auto Handsfree [only available if Full HF] — No / Yes
- HF Answerback — Yes / No
- Pickup Group — 1 / 2, 3, 4, 5, 6, 7, 8, 9, No
- Page Zone — 1 / 2, 3, 4, 5, 6, No
- Aux. Ringer — No / Yes
- Forward on busy — Forward to: None / (any DN #)
- Forward no answr — Forward to: None / (any DN #)
  - Forward Delay — 3 rings / 2, 4, 6, 10
- Hot line — None / Intml (and DN) or Extml (and 24 digit number)
- Priority Call — Yes / No

7. Service Modes — *Show*

- Control Sets — *Show line (1 to 80)* / None (any DN #)
- Name1: Night (max 7 Chars) — *Show*
  - Setting: Manual
    - Trunk answer — Yes or No
    - Extra-0 set — None (any DN #)
  - *Change* Auto
    - Start time — HH:MM
    - Stop time — HH:MM
    - Trunk answer — Yes or No
    - Extra-0 set — None (any DN #)
    - *Show line (1 to 80)*
    - Ringing Sets — ADD & REMOVE DN's
    - Aux. ringer — Yes or No
- Name2: same as previous mode — Evening
- Name3: same as previous mode — Lunch

8. Passwords — *Show*

- Admin password — ADMIN / max. 6 chars
- Restriction passwords — 0 to 99 (4 digits)

C. Set Copy

- SYSTEM Data
- SYSTEM+USER
  - Source DN
  - Destination DN's

D. Maintenance

1. System Version — *Show*

- SP: [illegible]
- RTP: [illegible]

2. Port/DN Status

- *Show Port* — 101 to 916 or DN
  - Version
  - State — Disable or Enable
  - >B2

3. Module Status

- *Show Module* — [illegible]
  - Version
  - State — Disable or Enable
  - No of Lines on module
  - No of Sets on module

4. Diagnostics

- Enter Test #
  - Run test on Ports
  - Run test on Modules
  - Disable at Idle
  - Disable at Once
  - Display Results
  - Cancel Test

5. System Test Log

- Alarm: Code
- Erase Log
- Date & Time
- Next Repeat

6. System Admin Log

- Alarm: Code
- Erase Log
- Date & Time
- Next Repeat

New or Enhanced feature over DR2 software

NMDR3PG [illegible]

Norstar Programming Road Map
I.T.A.S., Business Products Division, Calgary, Alberta

A. Configuration

1. Trk/Line Data — Show Line (1 to 184)
   - If entry is 81-184 (Target Lines) — Show
     - Received # — XXXXXXX
   - If entry is 1-80
   - Trunk Data — Show
     - Line XXX: — Loop; DID or E&M (E&M has 2 DTMF receivers)
     - Trunk mode — Super; Unsupr
       - If Super / If E&M / If DID — Ans mode — Manual; Auto
       - Ans with DISA — Y; N
       - Signal — Wink Start; Immediate or DelayDial
       - Gain — Normal; High
     - Dial mode — Pulse; Tone
     - Full AutoHold — No; Yes
   - Line Data — Show
     - Line type — Public; Private to (any DN#) or Pool (A to O)
     - Prime Set — 221; (None or any DN #)
     - Aux. ringer — Yes; No
     - Auto privacy — Yes; No
2. Line Access — Show Set (DN)
   - Line Assignment — 1 to 184; ADD or REMOVE Lines
   - Answer DN's — (None or any DN #); max. 4 Answer DN's/set
   - Ringing — Lines & Answer DN's Ring or No Ring
   - Line pool access — None; Pool A to O No or Yes
   - Intercom keys — 2; 0, 1, 3, 4, 5, 6, 7, 8
   - Prime line — None; I/C, Pool A to O, Line (If Assigned)
3. Call handling — Show
   - Hold reminder — N; Y
     - Remind delay (If HLR = Yes) — 60 sec.; 30, 90, 120, 150, 180
   - DRT to prime — Yes; No
     - DRT delay (If DRT = Yes) — 3 rings; 1, 2, 4, 5, 6
   - Tmstr callbck — 3 rings; 4, 5, 6, 12
   - Park prefix — 1; 0 to 9 or none
     - Park timeout — 45 sec.; 30, 60, 90, 120, 150, 180
   - Camp timeout — 45 sec.; 30, 60, 90, 120, 150, 180
   - Directd pickup — Yes; No
   - On Hold — Tones; or Music or Silence
4. Miscellaneous — Show
   - Backgrnd music — No; Yes
   - Direct-dial # — 0; (None or any available digit from 0 to 9)
   - DISA DN — None; any DN, same length as Target DN
   - Auto DN — None; any DN, same length as Target DN
   - Alarm set — 221; (None or any DN #)
   - CAP assignment — CAP 1 to 5: (None); (any DN #)
   - Link time — 500 ms.; 100 to 1000 steps 100
   - Set relocation — No; Yes
   - Hoot delay — 1000 ms.; 200 to 2000 steps 200
   - Supervision — 450 ms.; 60, 100, 280, 600
   - External code — 9; 0 to 9 (as available)
   - Line pool codes — A XXXX; Pool B to O (4 digits max.)
   - Installer passd. — CONFIG max 6 digits
5. System Data — Show
   - Individual DNs — Old DN (any DN #); New DN (any DN #)
   - DN Length — 3 Char's; (min. 3 chars with expansion Only) 4 to 7 Char's
   - Rec'd # Length — 3 Char's; (min. 3 chars with expansion Only) 4 to 7 Char's

B. General Admin

1. System Speed Dial — Show (1 to 70)
   - Number — No Number; max. 24 digits
   - Use prime line — Use line post code
   - Display digits — Y; N
     - Name — No Name; 16 Char's
   - Bypass restrn — N; Y
2. Names — Show
   - Set names — Show set (DN); max. 7 chars
   - Line names — Show line (1 to 80); max. 7 chars
3. Time & Date — Show
   - Time — HH MM
     - Change — Hour HH; Minutes MM
   - Date — DD MMM YY
     - Change — Year YY; Month MM; Day DD
4. Direct-Dial — Show
   - Set1 — 221
   - Set2 to Set5 — None to any DN
5. Capabilities — Show
   - Dialing Filters — Show Filter 1 to 99
     - Restr'n 01 to 48 — restriction; max. 15 digits
     - Excptn XXX — exception; max. 15 digits
     - (max. 400 rest and exceptions/system)
   - Rem access prgs — Show package 01 to 15
     - Line pool access — Pool A XXXX: N; Pool A to O Yes or No
     - Remote page — N; Y
   - Set abilities — Show Set (DN)
     - Set filter — 02; 00 to 99 (00 is no restrn)
     - Line/set filters — Show line (assigned)
       - Filter — None; 00 to 99 (00 is no restrn)
     - Set look — None; Partial or Full
     - Full handsfree — No; Yes
       - Auto handsfree (only available if Full HF) — No; Yes
     - HF answerback — Yes; No
     - Pickup group — 1; 2, 3, 4, 5, 6, 7, 8, 9, No
     - Page zone — 1; 2, 3, 4, 5, 6, No
     - Aux. ringer — No; Yes
     - Direct-dial: — assign Direct Dial sets — None; Set1 to Set5
     - Forward on busy — None; (any DN #)
     - Forward no answr — None; (any DN #)
       - Forward delay — 3 rings; 2, 4, 6, 10
     - Redirect ring — Y; N
     - Hotline — None; Intrnl (and DN) or Extrnl (and 24 digit number)
     - Priority call — Yes; No
   - Line abilities — Show line
     - Line filter — 03; 00 to 99 (00 is no restrn)
     - Remote filter — 04; 00 to 99 (00 is no restrn)
     - Remote pkg — 05; 00 to 15
   - COS passwords — Show password: 00 to 99
     - Pswd XX — XXXXXX; 6 digits
       - User fltr — Default; 00 to 99 (00 is no restrn)
       - Line filter — Default; 00 to 99 (00 is no restrn)
       - Remote Pkg — Default; 00 to 15
7. Service Modes — Show
   - Control Sets — Show line (1 to 184); None (any DN #)
     - Name1: Night (max. 7 Chars) — Show
       - Setting: Manual
       - Trunk answer — Yes or No
       - Extra-0 set — None (any DN #)
       - Change Auto
       - Start time — HH:MM
       - Stop time — HH:MM
       - Trunk answer — Yes or No
       - Extra-0 set — None (any DN #)
       - Show line (1 to 184)
       - Ringing Sets — ADD & REMOVE DN's
       - Aux. ringer — Yes or No
     - Name2: same as previous mode — Evening
     - Name3: same as previous mode — Lunch
8. Passwords — Show
   - Admin password — ADMIN max. 6 chars

C. Set Copy

- SYSTEM Data
- SYSTEM+USER
  - Source DN
  - Destination DN's

D. Maintenance

1. System Version — Show
   - SP — 30GEC xx
   - RTP — 30GBC xx
2. Port/DN Status
   - Show Port — 101 to 416 or DN
     - Version
     - State — Disable or Enable
     - >82
3. Module Status
   - Show Module — 1 to 8
     - Version
     - State — Disable or Enable
     - No of Lines on module
     - No of Sets on module
4. Diagnostics
   - Enter Test # — Run test on Ports; Run test on Modules; Disable at idle; Disable at Once; Display Results; Cancel Test
5. System Test Log
   - Alarm Code
   - Erase Log
   - Date & Time
   - Next Repeat
6. System Admin Log
   - Alarm Code
   - Erase Log
   - Date & Time
   - Next Repeat

DR4 Programming Road Map
This form is a road map of major headings of programming in Norstar Modular Design Release 4

New or Enhanced feature over DR3 software

Mar 91 Al Jacques

norstar

- **The Philosophy Of Meridian Norstar DR4 Is To Competitively Position The Product In A Total "Network" Connectivity Environment**

- **The Main Features Of Modular DR4 Are A Means To Provide Connectivity Within A Private Network (E&M Tie Line Trunking) And Utilize Line Concentration From The Public Network (Direct-Inward-Dialing)**

Compiled & Edited
By John Jenkins

Illustrated By
Lynn Mowat

Apendix 1 & 2
By Al Jacques

DR4 EXECUTIVE SUMMARY

INTRODUCTION

Strategic to most business communities is networking of telecommunications. Networking can be defined as the exchange of information or services among individuals, groups or in situations via an interconnected, or inter-related chain, group or system. Specifically, Telecommunications Networking is a group of switching systems linked together to permit end-to-end communications on a transparent basis.

Today's business community has recognized the importance of telecommunications networking as both a cost savings and competitive tool. In response to this, Norstar DR4 provides small line application PBX functionality, mainly through enhanced trunking capabilities (E&M trunking and Direct Inward Dialing trunking).

Following are brief descriptions of Enhanced DR4 capabilities, as well as detailed information sections on each new feature.

- **Private Network Connectivity**

  E&M (Excipere & Mittere) trunks provide a direct circuit or tie line between two subscriber (customer) systems utilizing industry standard Type II Interface.

- **Public Network Connectivity**

  Direct Inward Dialing (DID) trunking is a service provided by the Telephone Company (Central Office - C.O.) which allows an incoming call to reach a specific PBX/Key System station without attendant assistance. DID paths are employed to reduce the number of physical connections (paths) between the PBX/Key System and the C.O., they are one-way inbound trunks.

  Direct Inward System Access (DISA) is a facility which provides an outside caller with the ability to dial directly into a PBX/Key System without attendant intervention, to gain access to system facilities and outgoing trunk circuits.

- **Network Access Features**

  Selective Line Redirection (SLR) or external call forward allows any user to redirect incoming calls on one or more external lines to external only destinations (Feature 84).

DR4 NETWORK CONNECTIVITY

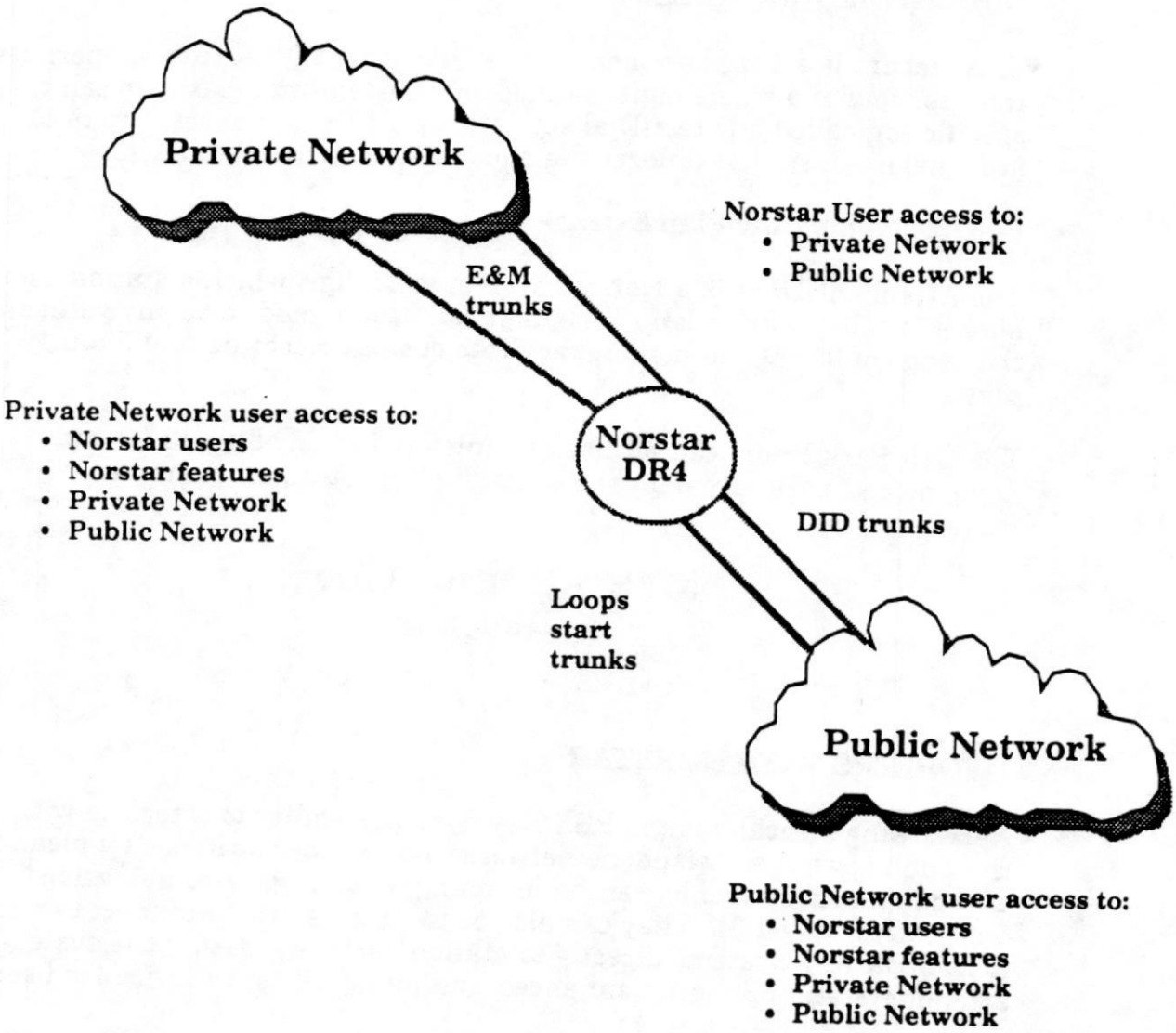


FIG 1.0

External transfer from Conference (Unsupervised Conference) permits the Norstar user to drop out of a conference involving two external parties leaving the others connected.

This feature is really an extension of "Transfer from Conference", which in DR3 or previous, required that at least one of the parties be internal to the Norstar system to at least monitor the conference.

- **Directed Dial - "0" Capability**

This feature is an enhancement to the DR3 "Dial - 0" feature. It permits the user to dial a single digit (defined on a system-wide basis) to call a specific set, called a Direct-Dial set. Multiple Direct-Dial sets (up to 5) are supported, so that different sets on one system can be called.

- **Flexible Numbering Plan Extensions**

The Attendant Digit is a Norstar system wide digit which a station user enters to call the attendant. The digit can be assigned to be any value in the range of 0 to 9 and none to facilitate customer coordinated dialing plans.

The Call Park Prefix can also be administered to any digit (0 - 9 and none: no call park) providing that the digit is not used by another feature.

NORSTAR MODULAR
DR4

NETWORKING WITH NORSTAR

Networking basically is the PBX/Key System's ability to interface with the public switched telephone network and/or other switches by means of trunks. These trunks can be incoming, outgoing, or combination (both ways) (Fig 1.0). They can also be tie trunks, which connect two or more PBX/Key Systems directly to station users, bypassing the system's attendants and providing enhanced and more efficient service for users.

Using three trunk types (E&M, DID, and Loop Start), Norstar fits into existing networks as
- an end-point (node) in the Private network
- a conventional main in the Public network

Typically, a trunk is a physical connection between switches in a network and a line is a physical connection between a switch and a device (eg. a telephone, modem, or fax machine).

In Norstar, a trunk is a physical connection between the Norstar system and the outside world. A line is a communication path between a station and the outside world. This communication path represents a many-to-one relationship (concentration) between trunks and lines (see DID section).

TARGET LINES - DR4 NEW TERMINOLOGY

In Norstar, a target line (communication path) is a flexible path through which an external user can directly connect (target) to a specific Norstar station. Calls to different Norstar stations can be routed through the same trunk or calls to a specific Norstar station can come in on different trunks. From the Norstar users perspective, a target line is no different from any other line except that it is incoming only.

TRUNK/LINE MAPPING CONCEPT

Logical lines (Target lines) are not physical connections but are provisioned through Norstar software. With Norstar Modular DR3 and earlier, physical trunk connections were made, then programmed (Appendix 1 A. Configuration, 2. Line Data). The programmed line could then be assigned to Norstar stations (A. Configuration, 1. Line Access).

DR4 introduces a Logical line concept (Target line) whereby physical trunks are programmed as line numbers 001-080 and the Target lines are programmed as line numbers 081-184 (Appendix 2, A. Configuration, 1. Trk/Line data, Line:).

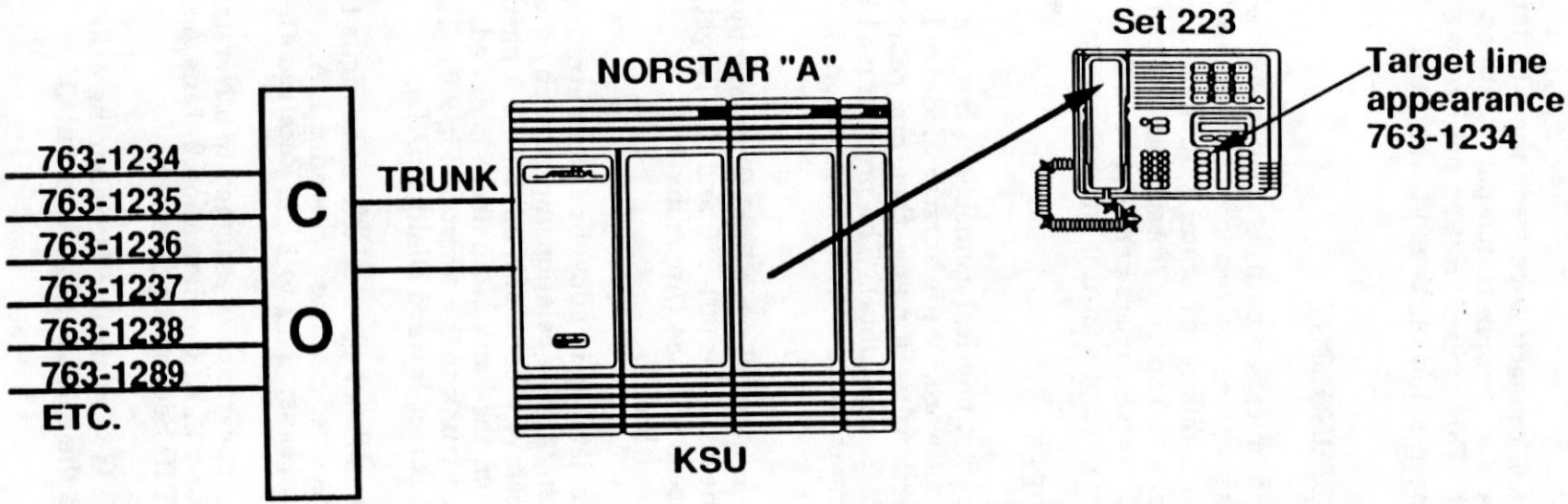
The Logical line concept is provisioned to allow line concentration. Line concentration represents a many to one relationship whereby the Central Office (C.O.) would reserve a bank of numbers for a particular customer. When a number from the bank of numbers is dialed, the C.O. sends the digits dialed on a free trunk to the Norstar (Fig 2.0). This type of line concentration is called Direct Inward Dialing (DID).

The Norstar has the ability to make a logical match to the digits that were dialed by checking the received number (Appendix 1, A. Configuration, 1. Trk/Line Data, Line: 0 8 1 to 1 8 4, Received #).

The Target line (Logical line) appearance is assigned to a Norstar station in Line Access (Appendix 2, A. Configuration,2. Line Access) in the normal fashion. (See the DID Section for details.)

The line concentration concept is very similar for incoming calls to the Norstar on E&M tie lines. (See the E&M Section for details.)

TRK/LINE MAPPING CONCEPT



REQUIRED NORSTAR PROGRAMMING
FOR THE PHYSICAL TRUNK

A. CONFIGURATION
1.TRK/LINE DATA
LINE: 001
TRUNK DATA
ANS MODE-AUTO

FOR THE TARGET LINE

A. CONFIGURATION
1. TRK/LINE DATA
LINE: 081 (LOGICAL LINE)
REC'D # 763-1234
2. LINE ACCESS
SET: 223
LINE ASSIGNMENT - LINE 081

Call sequence -
1. Caller dials 763-1234
2. C.O. selects free trunk and sends the digits to the Norstar
3. Norstar software makes a logical match (received #).
4. Norstar alerts any sets with the target line assigned.

FIG 2

ANSWER MODES

Norstar DR4 provisions for two trunk answer modes: (1) manual and (2) auto (Appendix 2, A. Configuration, 1. Trk/Line data, Trunk data, ans mode)

Manual:

- Manual Answer (loop start or E&M trunks) same functionality as DR3.
- Calls are made or received by going off hook.

Auto:

- Auto Answer mainly used for DID and E&M trunks.
- The Norstar system will answer the call and route it to a target line which is determined by the digit string received on that trunk.
- The auto setting is also used to configure Direct Inward System Access. (See DISA section for details.)

TIE TRUNKS - E&M SIGNALING

Tie trunks are special trunk circuits which interconnect, on a dialable basis, two or more PBX or Key Systems. Tie trunks are the arteries of a private network.

Signalling over tie trunks is generally of the E&M (Excipere & Mittere) type. In this configuration there are two or four "wires" used for signalling, as well as two or four "wires" for the voice path. The two signalling leads, the E-lead and the M-lead are not carried end to end as separate transmission facilities, but are multiplexed with the voice leads; logically, they can be considered to be independent of the voice, end to end. The C.O. E&M interface converts the voice and signalling information into a stream that is compatible with the transmission medium. The M-lead is for sending signals and the E-lead is for receiving signals.

The historic E&M lead signalling circuit uses only one lead for each direction of transmission. This means the current that flows between switching and signalling equipment must return over a common ground path (Fig. 3.0). It also means that the signalling leads have a greater noise influence than if the leads were balanced four wire (Fig. 3.1) as are transmission circuits. While the historic E&M signalling circuits operated satisfactorily in electro mechanical systems, they were not satisfactory for electronic switching systems. To differentiate between the two circuits, they are named TYPE I and TYPE II. The Type I circuit (Fig. 3.0) being the historic circuit used with electro mechanical systems and Type II circuit (Fig. 3.1) used with electronic systems.

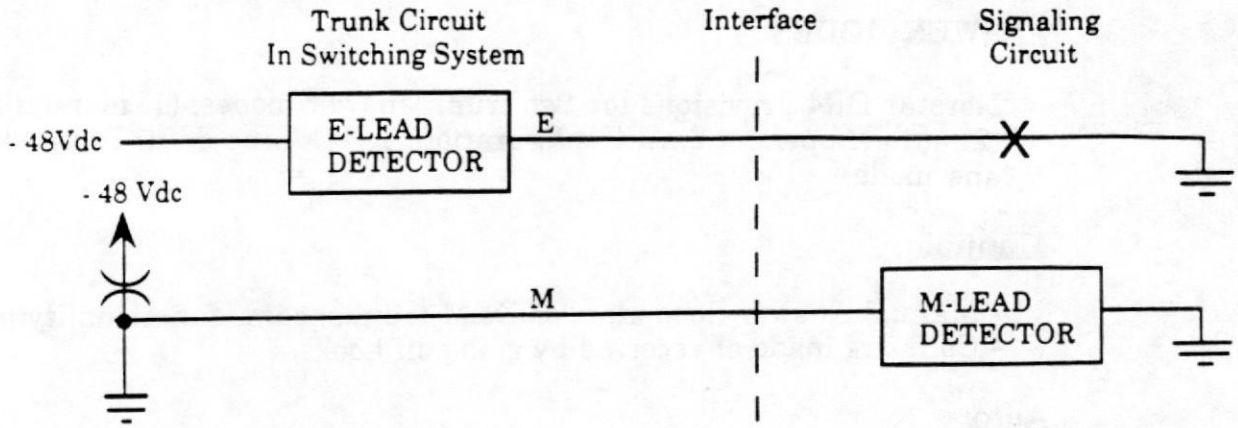


FIG 3.0

E&M Signaling - Type I

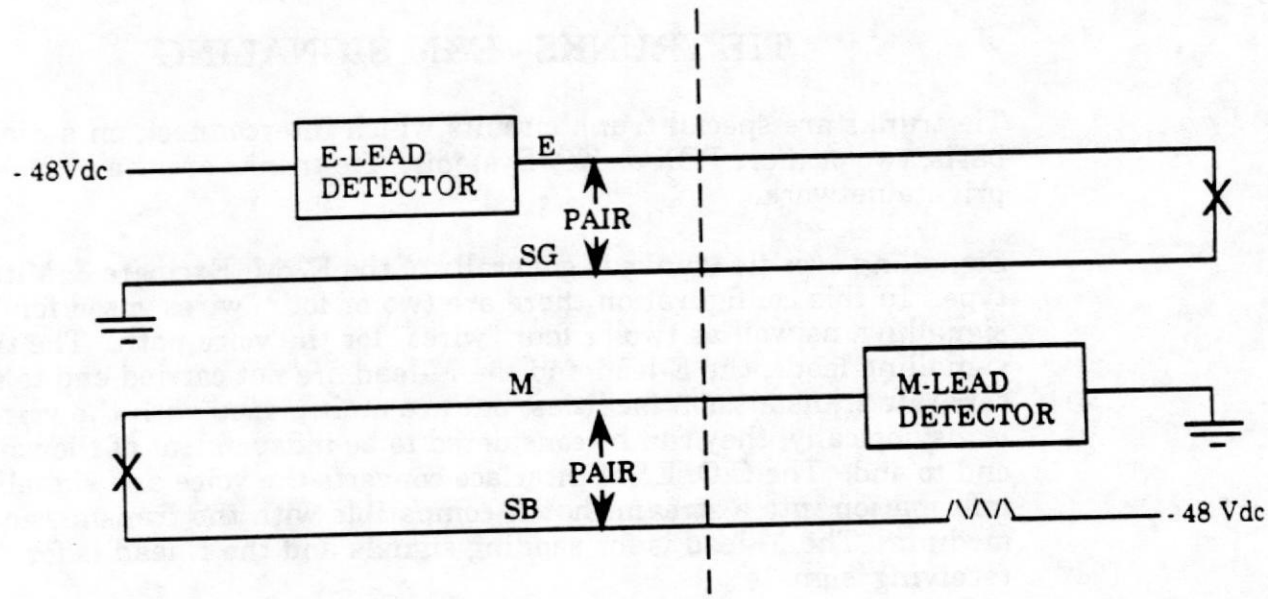


FIG 3.1

E&M SIGNALING - TYPE II

Type II circuits are the preferred arrangement of trunk interfaces in electronic switching environments. It is a 4-wire fully looped arrangement in which open and closure signals are used in each direction. Signalling from trunk circuit to signalling circuit is over the pair designated M, SB. The signalling circuit must supply -48V resistance protected battery on the SB lead and sense for the open and closure signals on the M-lead.

NORSTAR E&M TRUNKS

- **Definition**

  E&M trunks are used to directly connect two or more systems in a private network (Fig. 7.0).

  Two answer modes are supported in DR4: manual answer and auto answer. The answer mode (manual or auto answer) for each trunk determines the type of call treatment applied to the incoming calls on that trunk. (See Appendix 2, A. Configuration, 1. Trk/Line Data, Ans Mode).

  The manual setting is used to directly alert a station(s) with a line appearance associated with the trunk (ring down).

  The auto answer setting allows the trunk to be answered by the Norstar system. The Norstar looks at the digit string received on the trunk and makes a logical match by checking the received number (Appendix 2, A. Configuration, 1. Trk/line data, Line: 0 8 1 to 1 8 4 , Received #). See Trk/line Mapping Concept.

  Manual and auto answer E&M trunks can be used for making outgoing calls in the same way as outgoing calls are made in DR3.

- **Benefit**

  E&M trunks allow direct communication between users on a private network at a reduced cost since companies are typically charged a flat rate, as opposed to a per usage charge.

- **End User's View**

  To make an outgoing call, a station user on a Norstar system can access an E&M line either by selecting a key appearance of the line, or from a line pool, or by using the external line access code. The station user is immediately connected to the system at the other end and hears dial tone from that system.

  For incoming calls on an E&M line to the Norstar system, if configured for manual answer, the Norstar will supply ring back to the far-end and ringing cadence to the station(s) in the system with an appearance of that line.

  If the E&M is configured for auto-answer, the call is answered immediately by the Norstar system and dial tone is presented to the caller. The auto-answer E&M line can also be configured for Direct Inward System Access (DISA), whereby the Norstar system will present stuttered dial tone to the far end (see the DISA section for details).

- **Installation Details**

An E&M trunk cartridge is required to implement E&M connectivity. The E&M trunk cartridge is functionally integratable with current Norstar trunk cartridges and is inserted in the Norstar trunk module in the normal fashion (Fig 4.0).

The E&M trunk cartridge provisions for (2) E&M circuits.
NOTE: Maximum system configuration is reduced whenever an E&M cartridge is provisioned instead of a regular (4) circuit trunk card.

Physical wiring connections are shown in Fig 5.0. The Norstar E&M Type II requires all (8) leads to be connected. A transmission conversion unit (Voice Com or equivalent) could be used to convert Type I (6) wire to the required Norstar Type II (8) wire requirements.

The E&M trunk cartridge also provisions (2) additional DTMF receivers for use with loop start trunks. The DTMF receiver would be used if the loop start trunk was configured for DISA and auto-answer to decode the digit string (see the DISA section for details).

Fig 6.0 shows the wiring connections for two Norstar systems connected with E&M tie trunks.

Flexibility in choosing the type of supervision is provisioned such that Norstar can be configured to access all Central Office types (ie. analog and digital). (Appendix 2, A. Configuration, 1. Trk/Line Data, Signal - Options are; Wink Start, Delay Dial or Immediate Start)
NOTE: Match the Norstar signal type to the host C.O. or far end system in the case of two Norstar's connected.

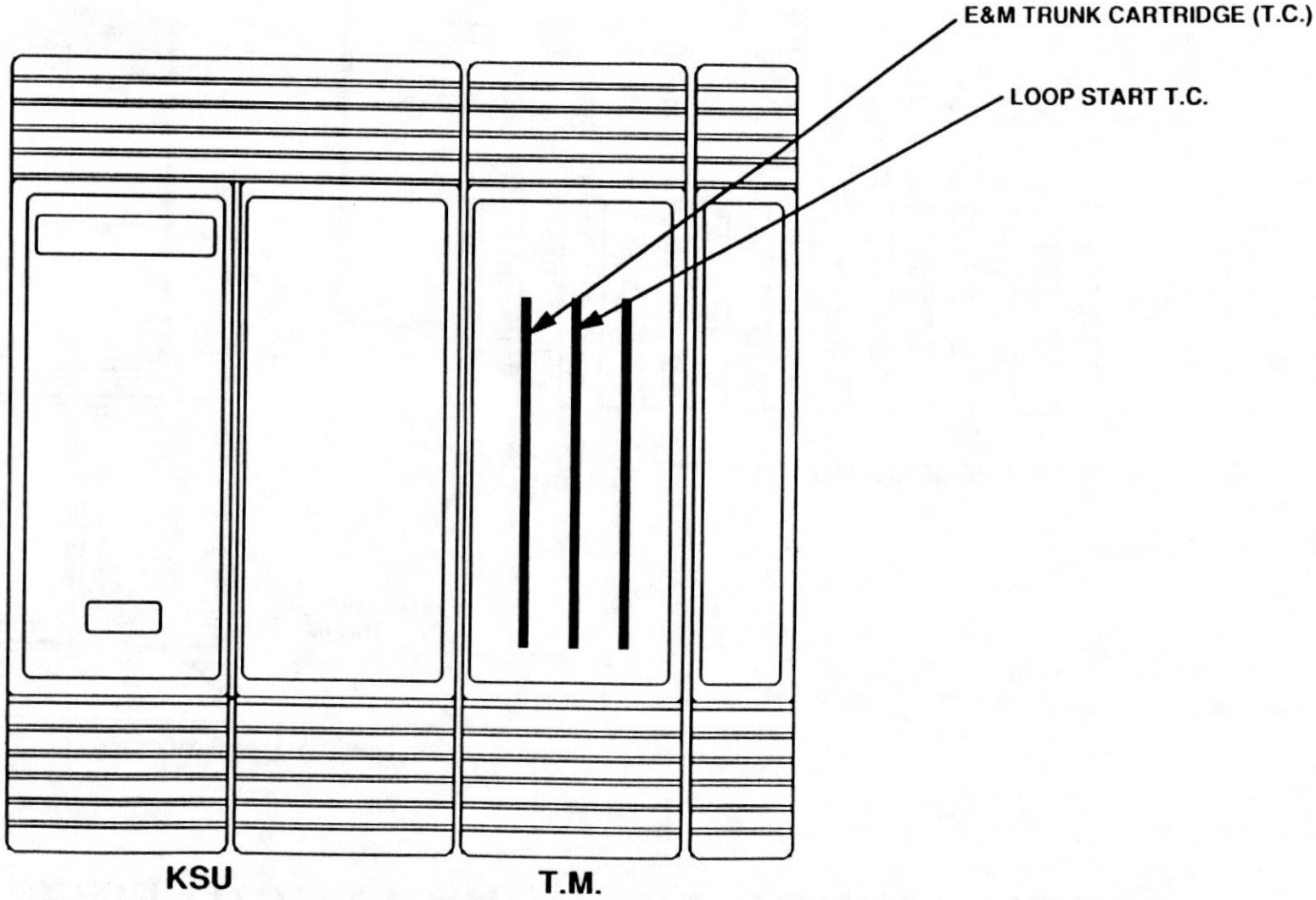
When configured for Immediate Start, the trunk is ready to register incoming dial pulses within 65 ms of C.O. seizure. Immediate start signalling uses "dial pulse" addressing only and would be used behind Step-by-Step C.O.'s (analog).

When configured for Wink Start, the trunk reverses battery and ground to the C.O. for 140 - 290 ms to indicate it is ready to receive address signalling.

Wink Start signalling is the default setting in Norstar and is commonly used behind Common Control C.O.'s (digital).

When configured for Delay Dial, the trunk reverses battery and ground towards the C.O. for >140 ms and until it is ready to receive address signalling, at which time it returns normal battery polarity to the C.O.. The battery reversal does not happen until 100 mS minimum and 150 mS maximum after receiving a valid incoming seizure signal from the C.O.

E&M TRUNK HARDWARE CONFIGURATION



- EACH E&M T.C. PROVIDES (2) E&M TRUNK CIRCUITS

FIG 4.0

E&M TRUNK HARDWARE CONNECTIONS

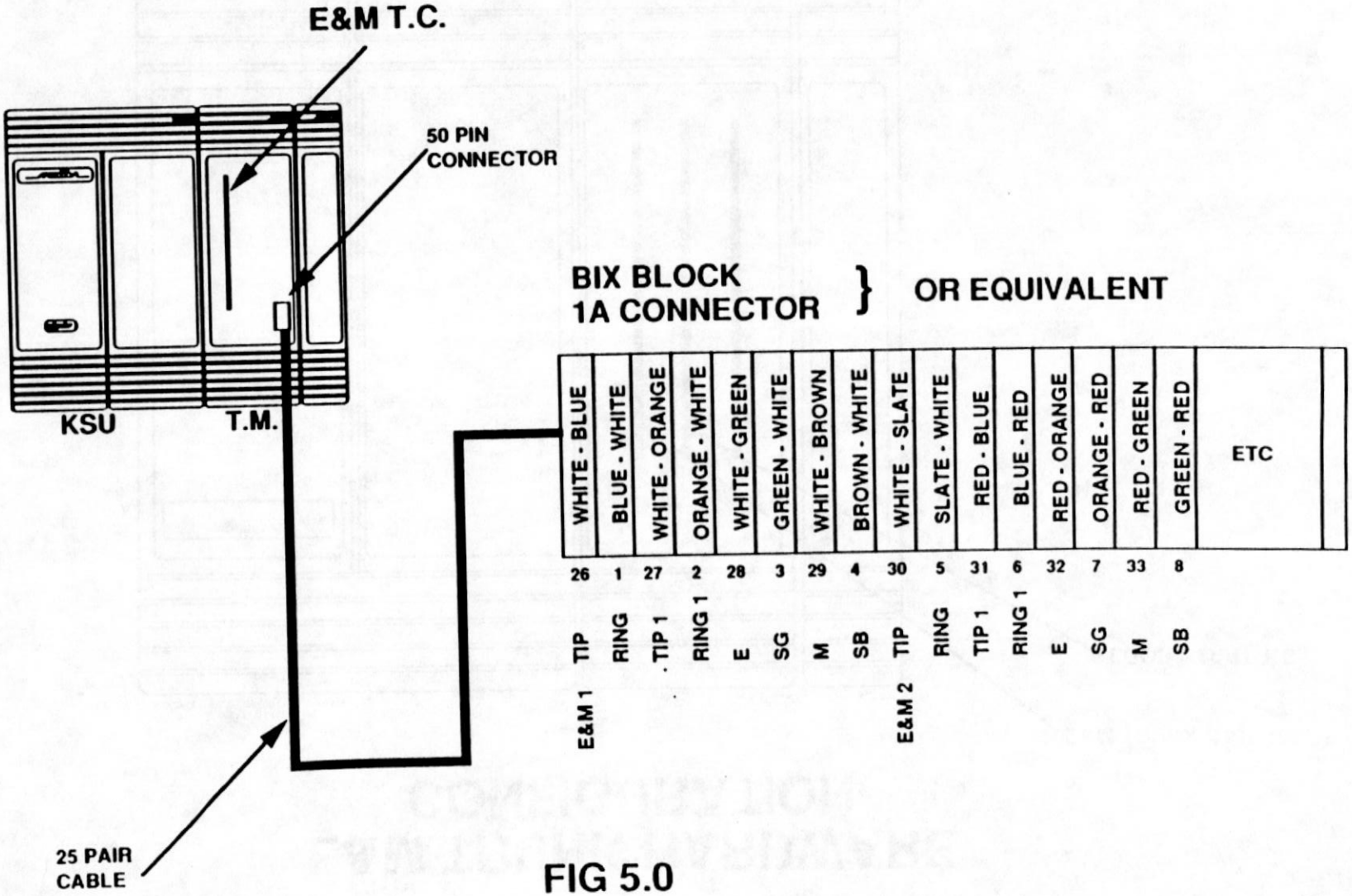
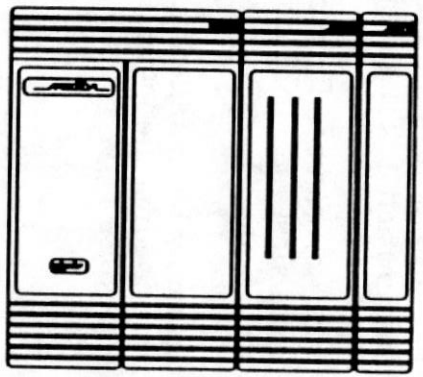


FIG 5.0

NORSTAR TO NORSTAR
VIA E&M TRUNK

NORSTAR SYSTEM A



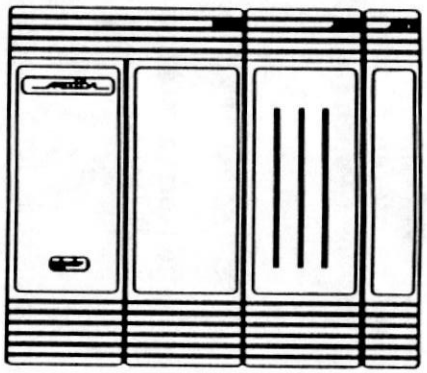
KSU T.C.

WINK START

E&M CONNECTIONS

T	T1
R	R1
T1	T
R1	R
E	SB
SG	M
M	SG
SB	E

NORSTAR SYSTEM B



KSU T.C.

WINK START

NOTE: THE SIGNAL TYPES SHOULD MATCH

FIG 6.0

- **E&M Tie Trunk Examples**

When a user from system A (Fig 7.0) accesses the tie line to Norstar system B, the user will be presented with dial tone from system B. when configured for auto-answer (Appendix 2, A. Configuration, 1. Trk/line data, Ans Mode, Auto).

The user now has the following options:

- dial directly to a specific Norstar station (Target line call). If the target line is busy, Overflow Call Routing would route the call to the prime set for that line

- dial the line pool access code for an outgoing tie line (if configured) to System C

- dial the feature code for the Norstar paging system.

If the tie line from system A to system B was configured for manual answer; the user would access the line as before, but all Norstar stations in system B with that line appearance would ring (operates as a ring-down tie line, or hot line).

Calls may also be made from Norstar system B to system A. Norstar system B users can:

- dial a line pool access code to select an outgoing line from an E&M line pool or
- select an E&M line on the station by pressing a line button.

NOTES:

1. When programming line pools, assign lines that have the same access to the same pool. In addition, each line pool should have only one type of line in it (that is, don't mix E&M lines with loop start in the same pool).

2. An E&M line may be configured as the prime line for a Norstar station (Appendix 2, A. Configuration 1. Trk/line data, line data, prime set).

3. When an E&M trunk is configured for manual answer (ring-down), the Norstar will not enable alerting until incoming seizure persists for at least 150 mS. This prevents "Glare".

4. E&M trunk cartridges may be installed in the same module as loop start or DID trunks and may be installed with Release 1 KSU's (A0357464/NT5B20FA-93).

E&M TIE TRUNK EXAMPLE

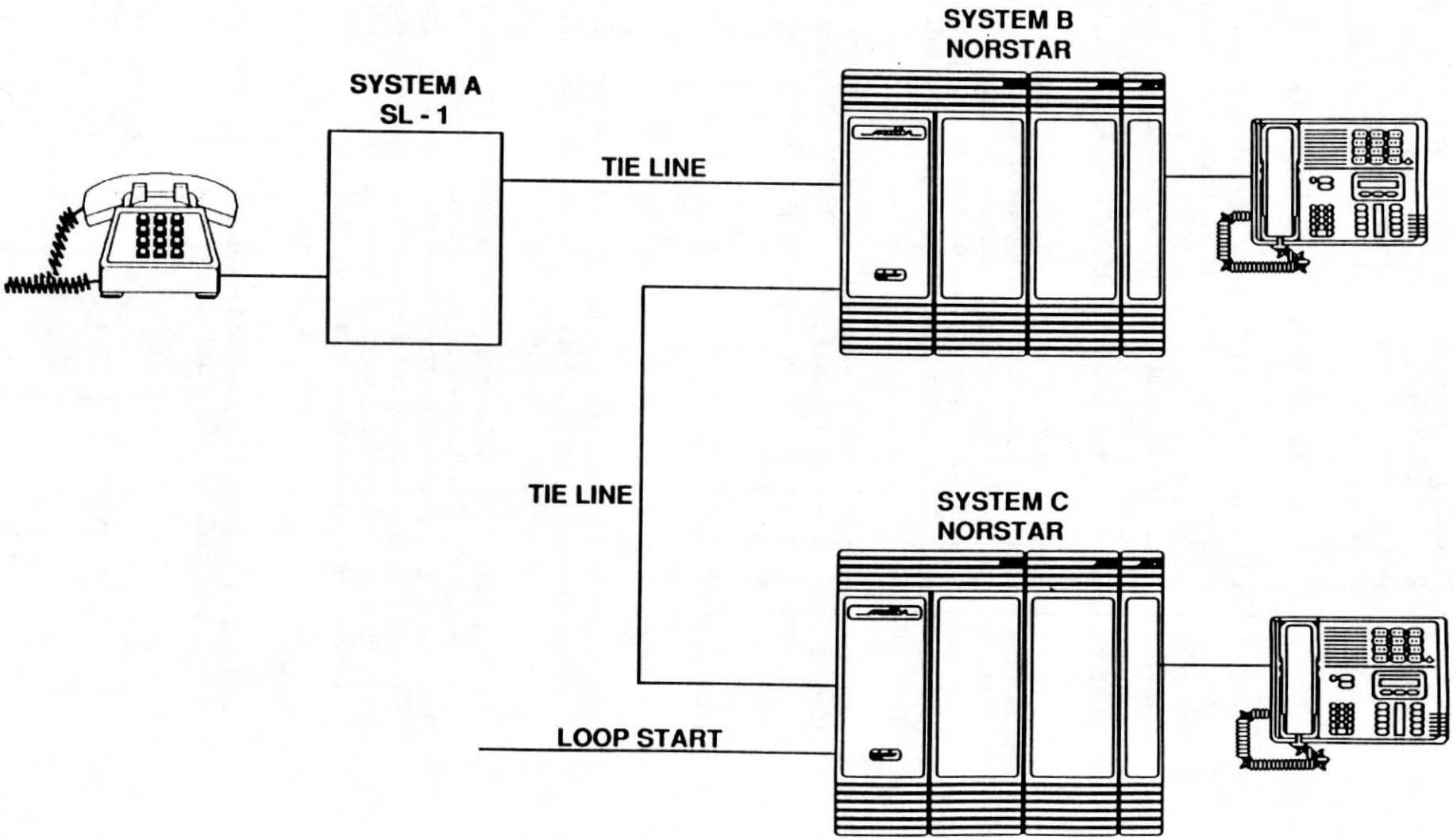


FIG 7.0

7 db
INDUCES LOSS TO compensate for 2/4 to facility with gain.

5. ~~In instances where an E&M tie trunk is used between two Norstars not connected via a C.O., a gain could be induced by the Norstar system (Appendix 2, A. Configuration, 1. Trk/Line data, trunk data, gain). The default setting is "Normal" and the other setting is "High". The high setting injects a 7 db gain to the circuit.~~

DIRECT INWARD DIALING

With Direct Inward Dialing (DID), the capability to bypass the system's attendant reduces the requirement for an attendant, thus reducing overhead. Additionally, DID provides direct access to the called party resulting in the perception of much more personalized service. The combined effect is reduced costs with more efficient and effective call processing, a necessity in the competitive corporate environment.

A common application for DID is found in the yellow pages under department store listings. A store will have a main directory number listed and below will be seven digit numbers for many departments in the store. A caller who looked up the number for the furniture department can dial that department directly without talking with the store operator.

DID trunks can be much less expensive than Centrex service by concentrating a few DID trunks into the PBX/Key System rather than the normal Centrex offering of wiring each station to a port in the serving Central Office.

NORSTAR DID

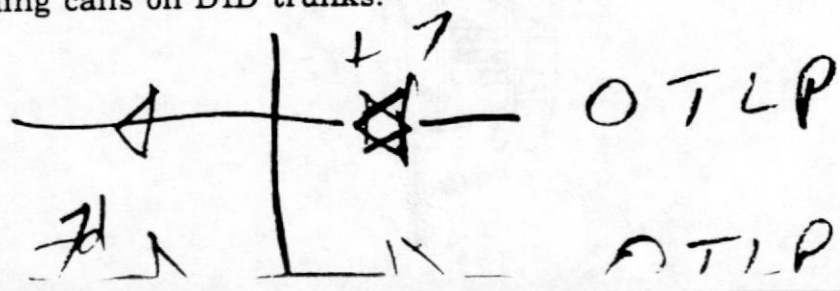
- **Definition**

DID trunks are incoming paths only, from the central office to the Norstar system, they provide line concentration and must be supervised. (See Trk/Line Mapping Concept Fig 2.0).

The Ans Mode "must" be configured to auto. (Appendix 2, A. Configuration,1. Trk/Line data, trunk data, Ans mode) This allows the Norstar to look at the digit string received on the trunk and make a logical match by checking the Received # (Appendix 2, A. Configuration, 1. Trk/line data, line: 0 8 1 to 1 8 4, Received #). If a match is made, the station(s) with the assigned target line will alert.

- **Benefit**

DID allows attendant bypass and extends Norstar call coverage features to incoming calls on DID trunks.



- **End User's View**

An incoming DID call is routed to the required target line and alerts at every set with an appearance of that target line. The user answers the call as he does any other, by selecting the target line appearance, invoking off-hook call queuing, etc.

A user may also have a physical appearance of the DID trunk for monitoring purposes.

An outgoing call cannot be made on a line key associated with a DID trunk (physical appearance) or with a line key associated with the station's target line appearance.

- **Installation Details**

A DID trunk cartridge is required to implement DID connectivity. A DID trunk cartridge is functionally integratable with current Norstar trunk cartridges and is inserted in the Norstar trunk module in the normal fashion (Fig 8.0).

The DID trunk cartridge provisions four (4) DID trunk circuits. Physical wiring connections are shown in Fig 9.0.

- **CCI**

The CCI (Control Circuit Interface) connections provide an indication of the operation status of the DID trunk cartridge to the C.O.. When the CCI relay contact is open, it implies that the DID trunk cartridge is fully operational. When the CCI relay contact is closed (ie., short circuit across the CCI leads), this implies that the DID trunk is no longer capable of handling incoming calls. This relay state could be triggered by any of the following events:

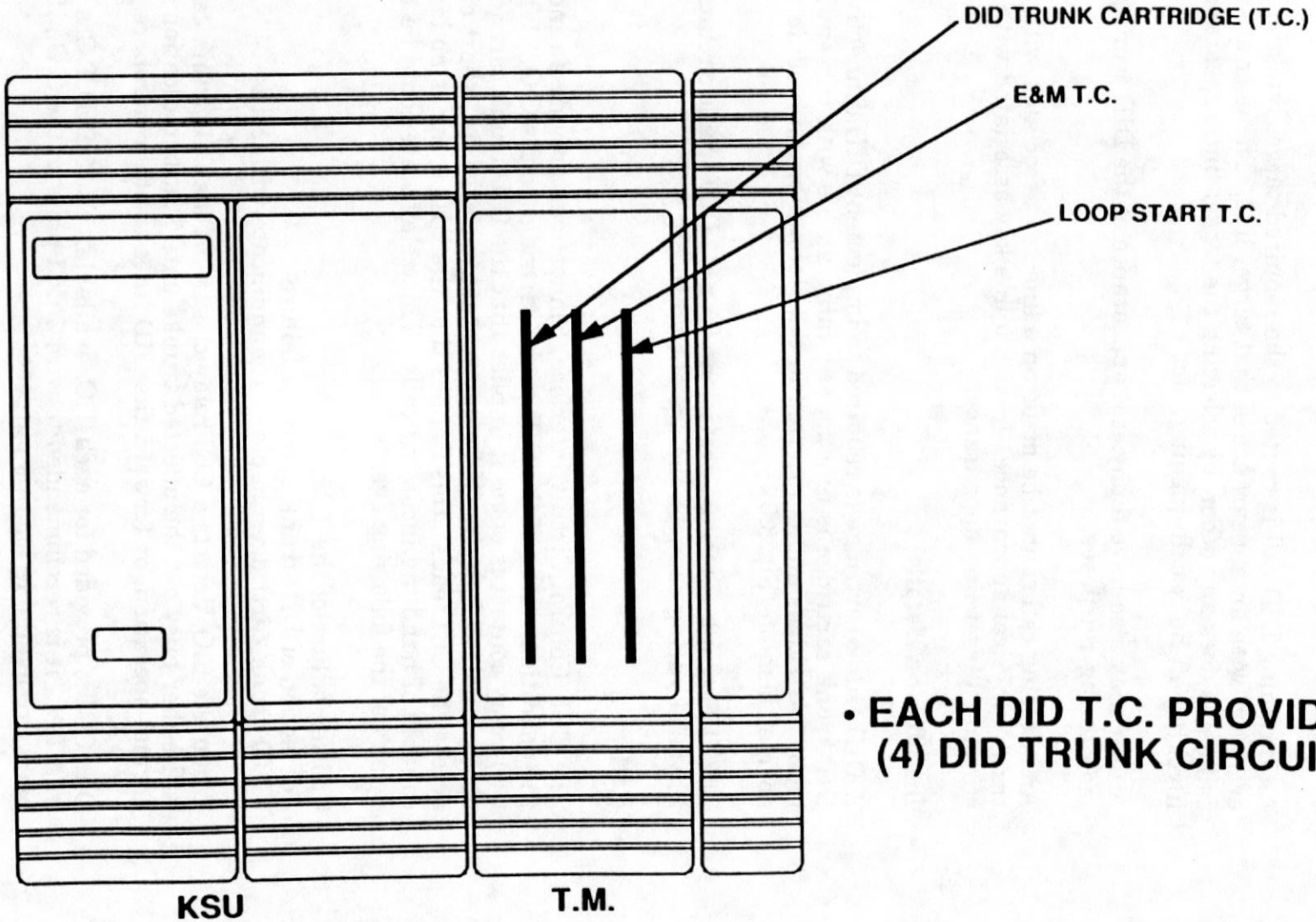
- power failure of the T.M.
- detection of DID trunk cartridge failure
- DID trunk cartridge unable to communicate with core

When the C.O. detects a CCI relay closure at the DID trunk cartridge, it will either busy out the affected trunks until status indication changes to normal operation, or forward the DID lines to other numbers.

One CCI is provided for each T.C. available. For 3 DID T.C.'s installed in a T.M., it is recommended to wire 3 CCI pairs to the C.O., if those pairs are available for this purpose.

The implementation provided here is, however, flexible enough to allow CCI pairs from multiple T.C.s to be connected either in parallel or in

DID TRUNK HARDWARE CONFIGURATION



- EACH DID T.C. PROVIDES (4) DID TRUNK CIRCUITS

FIG 8.0

DID TRUNK HARDWARE CONNECTIONS

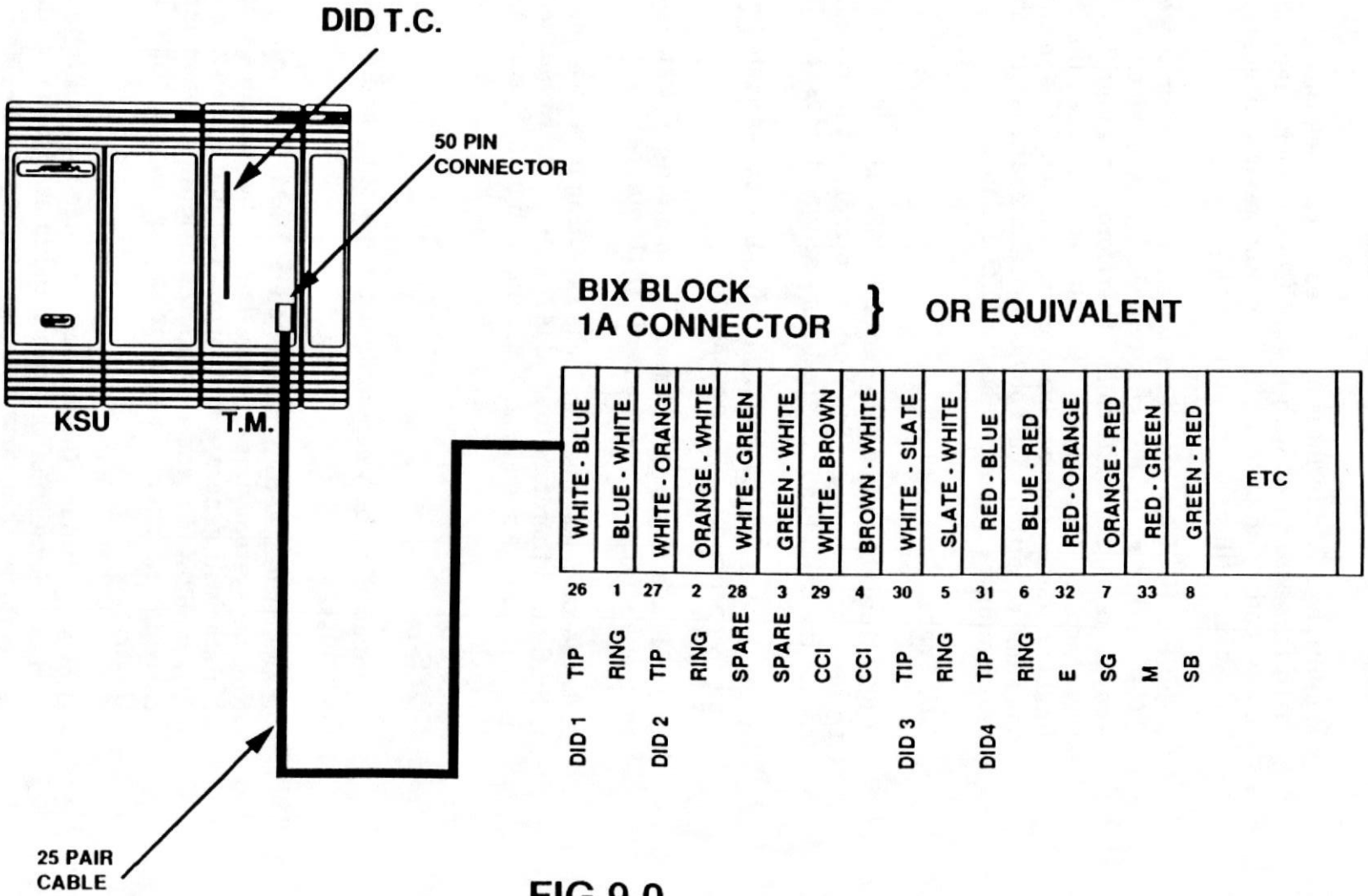


FIG 9.0

series combination "at the MDF" to minimize the number of pairs wired back to the C.O. It is important to note that in doing so reduces the validity of the CCI function as follows:

- If multiple CCI interfaces are wired in parallel, then any of the DID cartridges associated with those CCI's can signal its unavailability to receive calls, and take all T.C.'s out of service unnecessarily, since those T.C.s could still be fully operational.

- If multiple CCI interfaces are wired in series, then it would require "all T.C.s" in that group to signal (via their respective closed relay contact) unavailability to handle calls. Therefore, if a single T.C. is unable to receive calls, and closes its CCI relay contact, then the C.O. will be unable to detect this condition until all other T.C.'s in that group signal the same condition. This obviously reduces the effectiveness of the C.O. reassigning calls from defective DID T.C.s.

- **DID Trunk Examples**

  A user from the public network dials 763-1234. The C.O. selects a free trunk to the Norstar. The Norstar interprets the incoming digits and routes the call to the assigned Norstar target lines (Fig 10.0).

  In Fig 10.0 each DID "telephone number" is associated with a target line which appears on only one station.

  In Fig 11.0 a target line is assigned to multiple stations allowing more than one station to use the same DID "number".

  In both examples, the Norstar is expecting to receive (4) digits. The C.O. is configured therefore to send (4) digits to the Norstar and absorb the first (3). (See Appendix 2, A. Configuration, 5. System Data, Received Length.)

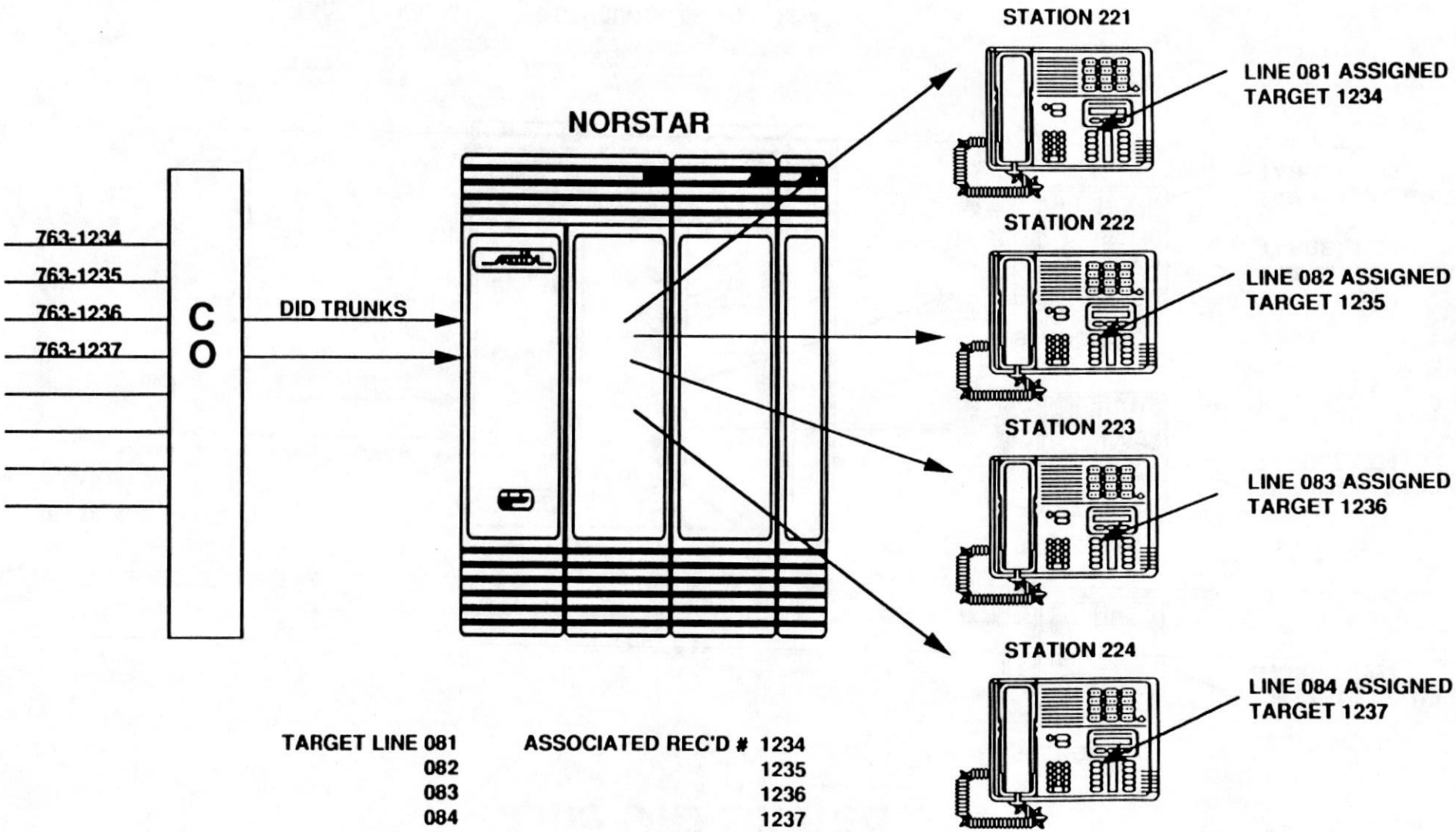
- **NOTE:**

  Incompatibility between configuration setting and actual Trunk Cartridge:

  - If a particular setting is selected ie; E&M, DID, or loop start and the Norstar system subsequently detects incompatible trunk hardware the Norstar will generate an alarm. The maintenance alarm will be "Alarm:62-X-Y", where "X" is the module number and "Y" is the cartridge number. The alarm means "Incompatible Trunk Cartridge".

  - Browsing through the various cartridge type settings doesn't affect the current operation of the associated lines. However, any lines that are associated with a cartridge that has its type changed during the

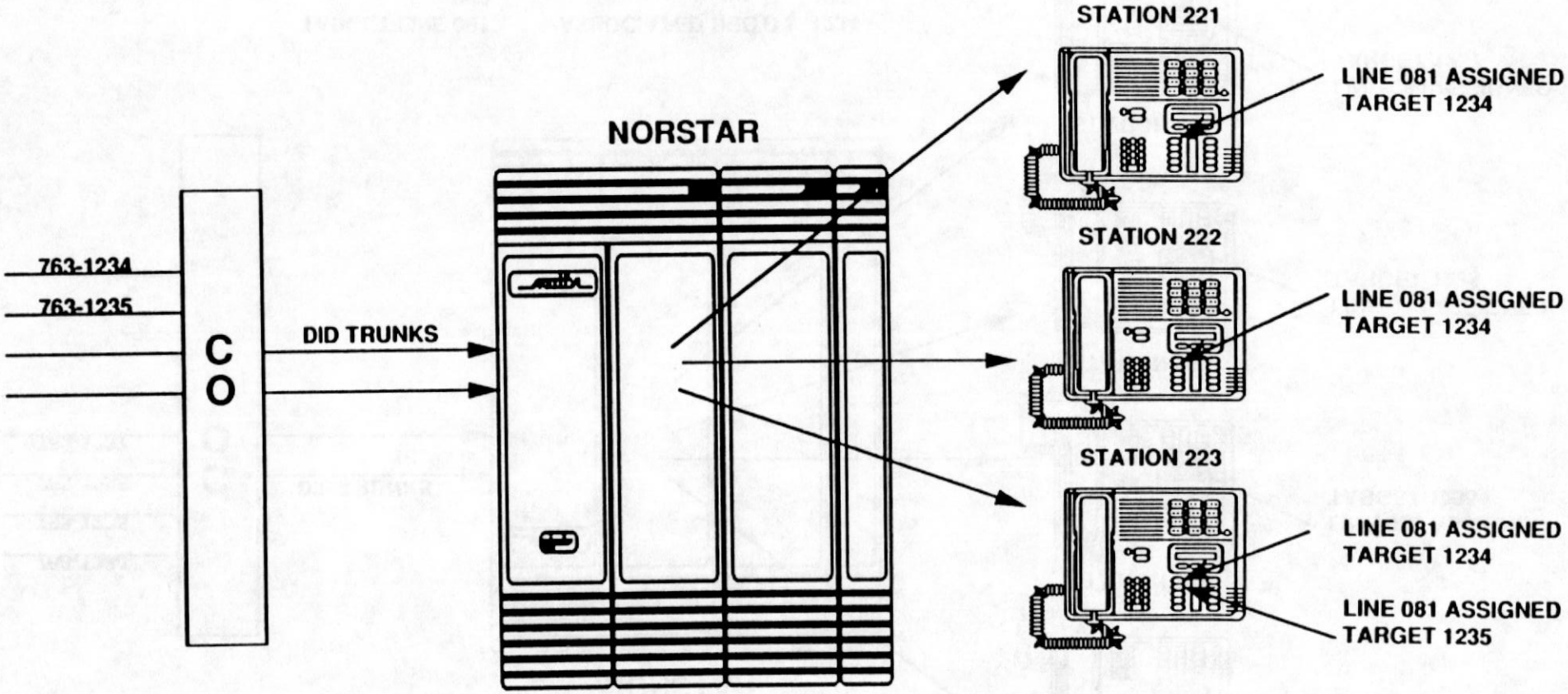
DID
One DID per Station



TARGET LINE	ASSOCIATED REC'D #
081	1234
082	1235
083	1236
084	1237

FIG 10.0

DID
One DID Shared



TARGET LINE 081
082

ASSOCIATED REC'D # 1234
1235

FIG 11.0

programming session will be disabled upon completion of the session and only re-enabled when the hardware installed is changed to match the new setting for the cartridge type.

A prime set may be specified for a DID target line. Existing call processing rules (DRT, etc.) would apply.

If a DID target line was in use when called, the Norstar would route the call to the prime set for that line.

DIRECT INWARD SYSTEM ACCESS (DISA)

DISA or remote access allows users elsewhere on the private or public network to call into a Norstar system and, once on that system, gain access to a subset of that system's resources.

Access to a private network from a set external to the system cost effectively enables that user to avoid long distance charges (Fig 12.0). Typical applications include sales persons or maintenance personnel. Further applications include allowing a Main Frame Computer to poll PC's at various branch locations after business hours.

Features and services typically available via DISA access are Internal Calls, Trunk Calls, and limited features of the Norstar system.

DISA is typically configured by assigning a special nonpublished number (trunk) which when connected to the Norstar system immediately answers upon detection of ringing.

NORSTAR DISA

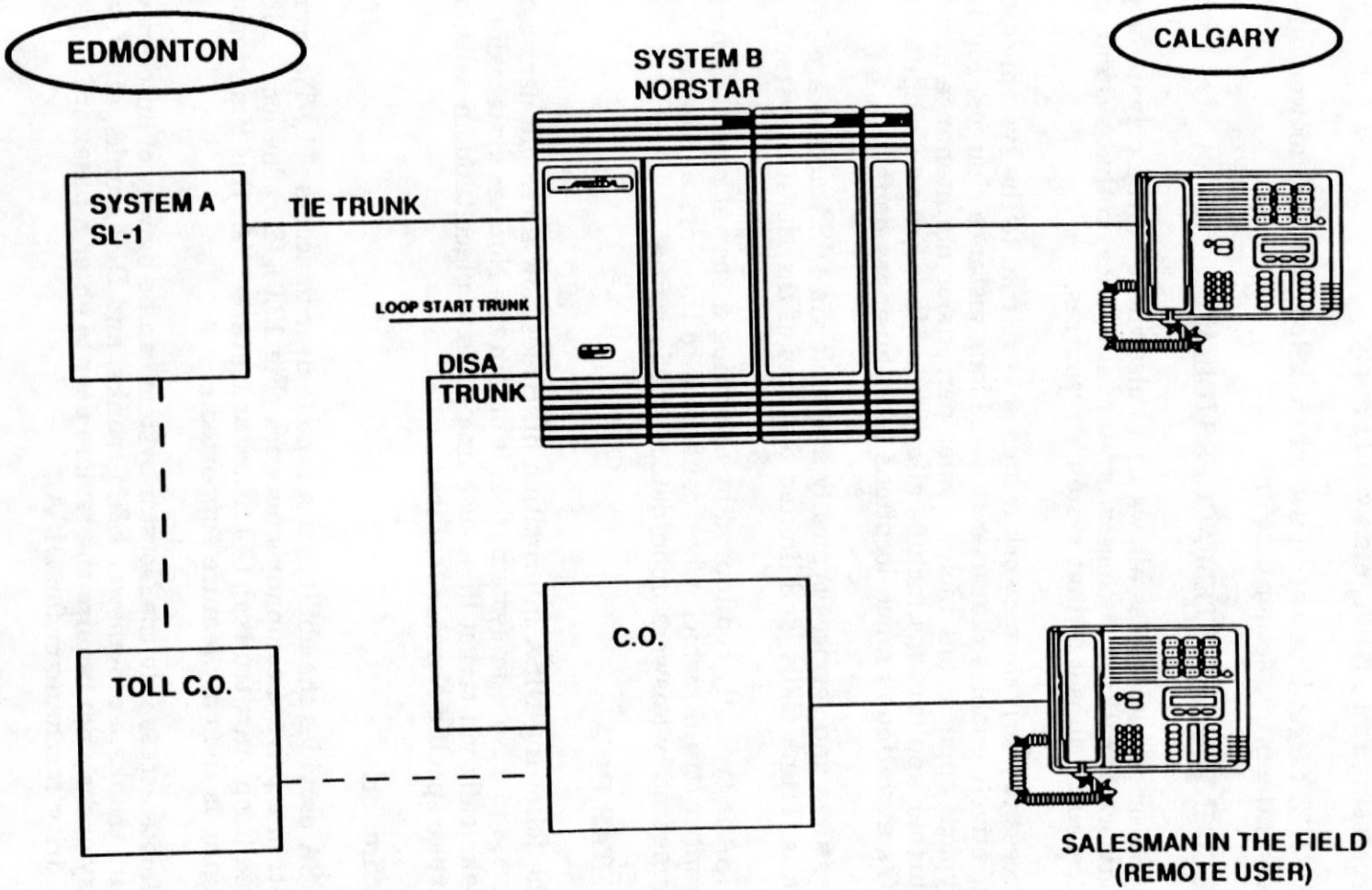
The following DISA information describes how a remote user can gain access to a Norstar system, that is obtain the Norstar system dial tone to make calls via target lines, use line pools to place tandem calls, and invoke specific Norstar features.

- **Definition**

DISA provides the ability for a remote user to access : (1.) Tie trunks within a private company's network (Fig 12.0), (2.) The local calling area (loop start trunks), (3.) Norstar features. (At this time remote paging is the only feature supported.)

Remote access into the Norstar system can be by way of auto-answer loop start trunks, auto-answer E&M trunks, and DID trunks, all of which may or may not require the remote user to enter a password to pass the security mechanism for DISA.

DISA



The Salesman can use DISA to provide access to the Norstar system, then use an access code to GAIN access to the SL-1 system, rather than use the Public Network and incur toll charges.

FIG 12.0

- **Benefit**

  DISA provides a mechanism which permits people away from the office to make use of Norstar facilities (private network) and features (paging) remotely, bypassing the normal toll costs associated with using the public network.

- **End User's View**

  When a remote user wants to access a Norstar system, the user would dial the number (via the public network) or select the trunk (private network) that is configured to answer automatically with DISA (Fig 13.0).

- **Installation Details**

  The Norstar provides DISA access via an auto-answer E&M trunk or DID trunk. This is accomplished by programming a "DISA DN" (Appendix 2, A. Configuration, 4. Miscellaneous, DISA DN:). A remote user dials the "DISA DN" digit string into the Norstar on a DID or E&M trunk. The Norstar makes a logical match and will return stuttered dial tone, requesting Class of Service (COS) password access to the system (Fig 14.0).

  COS replaces DR3 and earlier Restriction passwords. The COS passwords may still be used with F68 as Restriction Override passwords.

  COS passwords are programmed in Appendix 2, B. Administration 5. Capabilities, (new DR4 term), COS Passwords, Set Abilities.

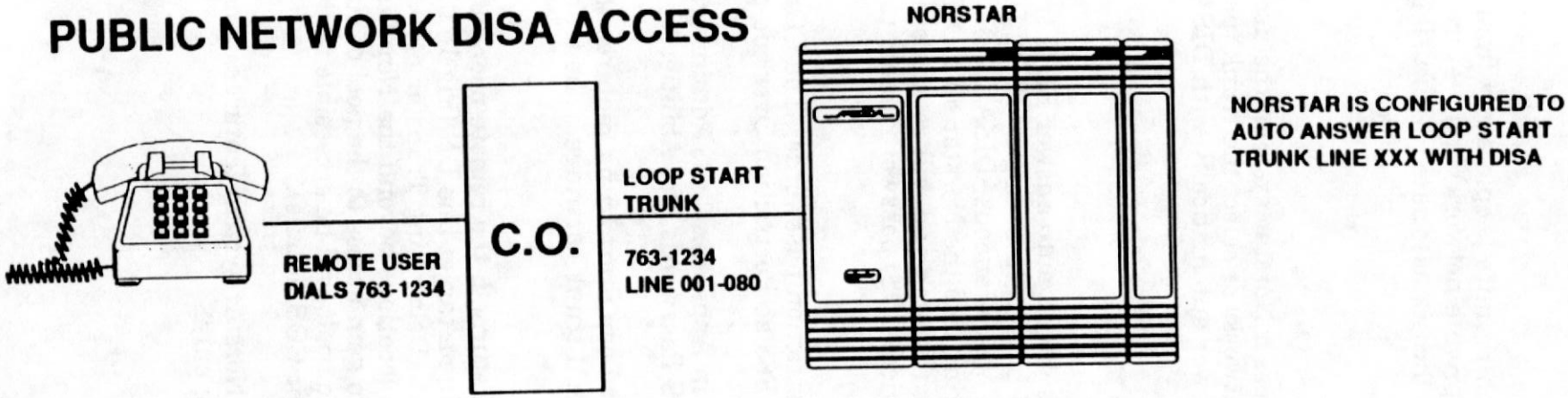
  Remote Access via an auto-answer Loop Start trunk requires the use of a DTMF receiver provided by the E&M trunk cartridge. The trunk must provide disconnect supervision.

  Once Norstar system dial tone is returned, the remote user can make calls to target lines by simply dialing a target line DN (Fig 15.0). The call will follow the call processing rules (Delay Ring Transfer etc.). The remote user can also "Tandem" to locations beyond the Norstar system by dialing a line pool access code to gain access to the pool of outgoing lines. The COS dictates which line pools will be accessible to the remote user (see Enhanced Restrictions for COS details).

  The remote user may also invoke Norstar system features. The initial release of DR4 will support paging only.

DISA ACCESS

PUBLIC NETWORK DISA ACCESS



PRIVATE NETWORK DISA ACCESS

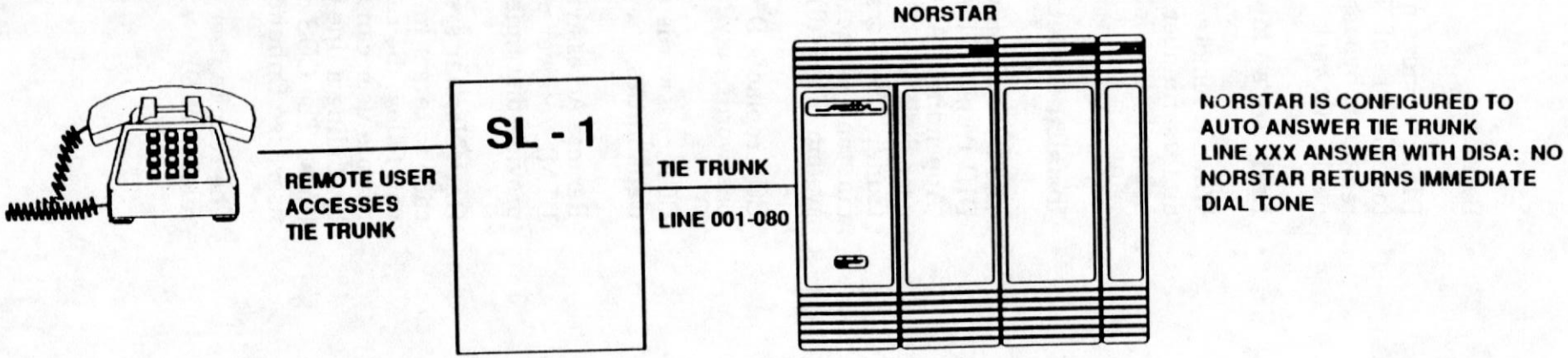
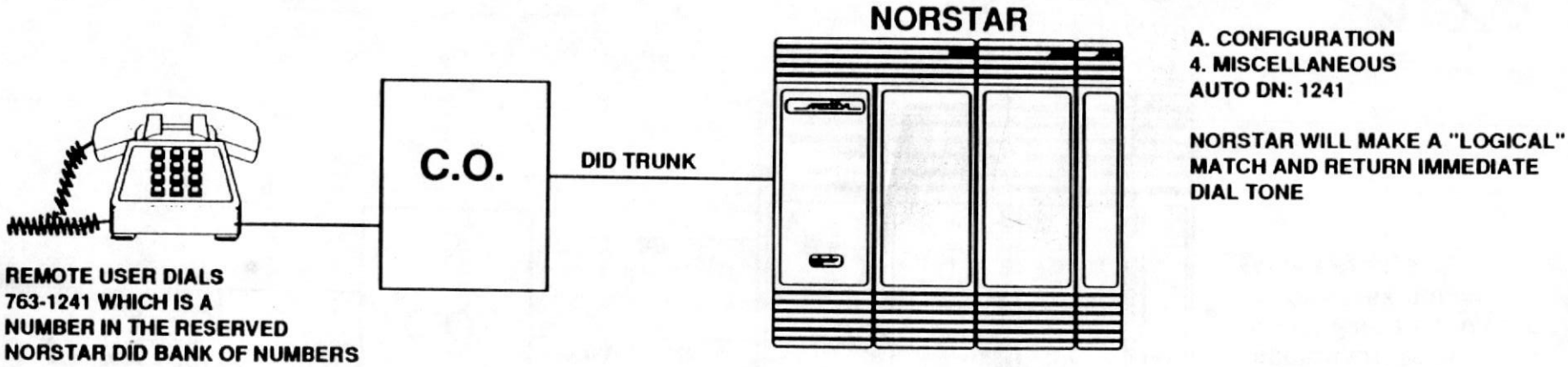


FIG 13.0

DID DISA



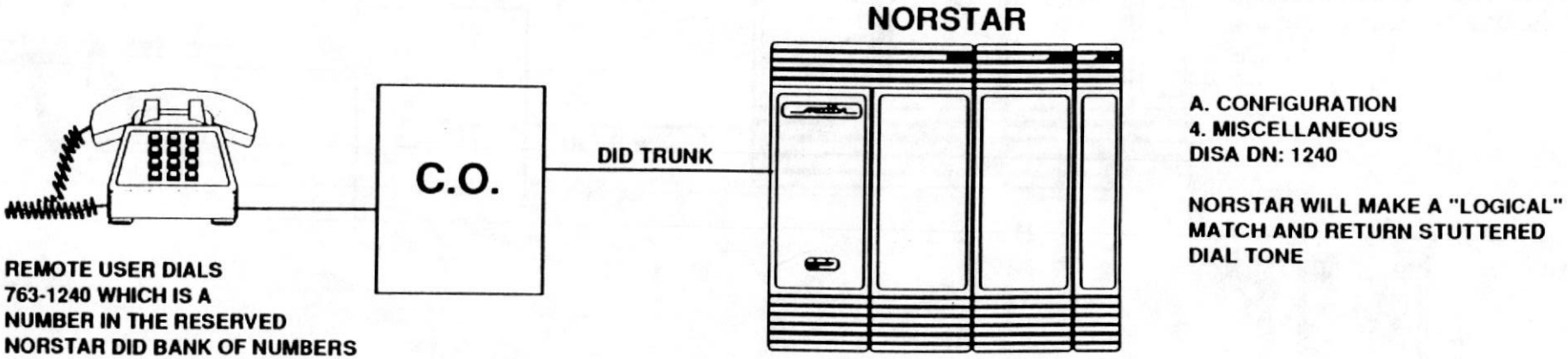


FIG 14.0

DISA ACCESS

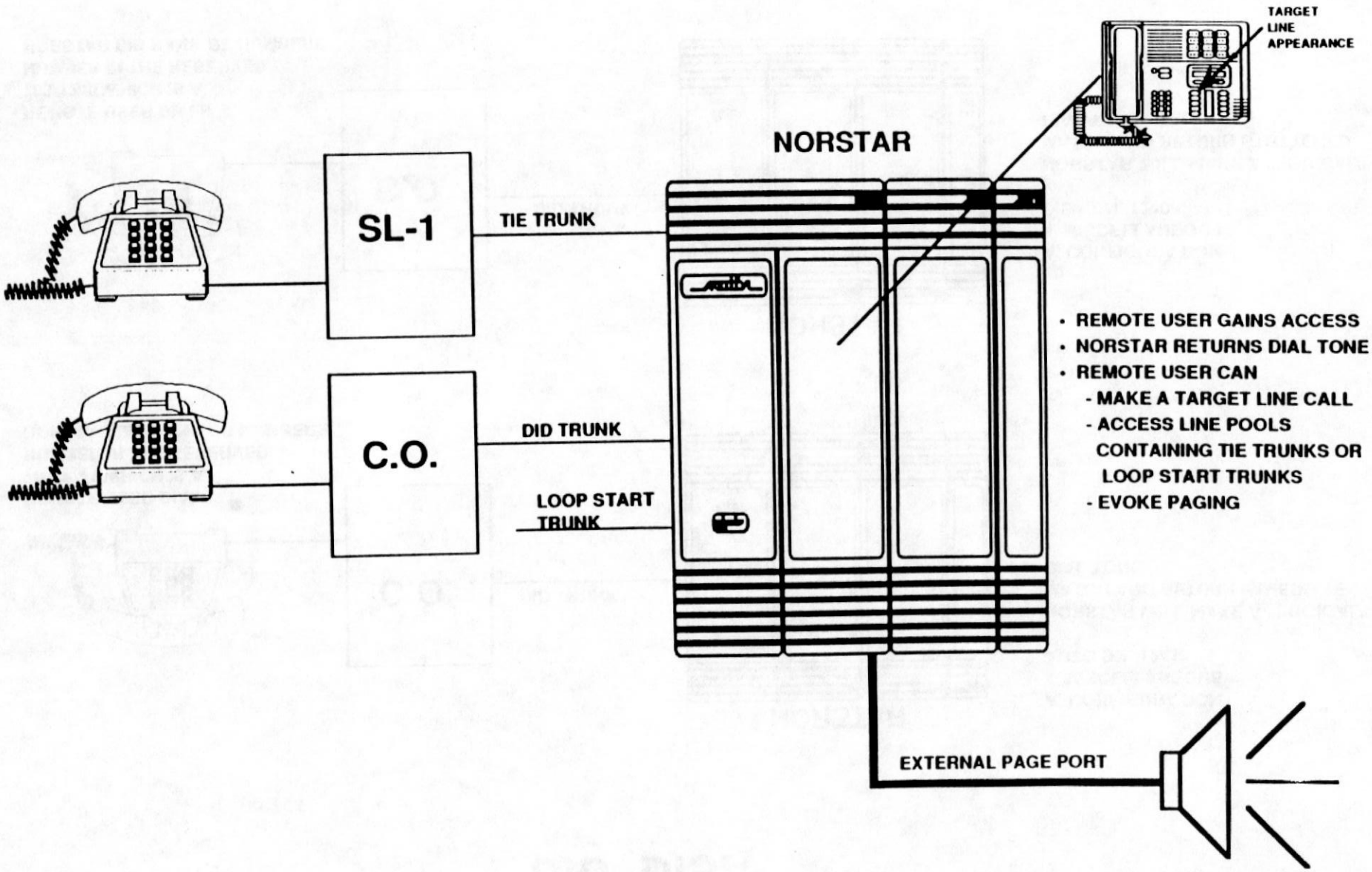


FIG 15.0

NOTE:

Remote access to the Norstar via an E&M tie trunk may be configured to return immediate dial tone rather than stuttered dial tone. The need for a security mechanism (stuttered dial tone with password access) is usually not an issue within a private network.

Instead of using the "DISA DN:" for stuttered dial tone access, the remote user would use the "Auto DN:" to return direct Norstar system access without a password. (Appendix 2, A. Configuration, 4. Miscellaneous, Auto DN:)

An E&M, DID or Loop Start Trunk could be dedicated to DISA use by programming the auto-answer trunk to answer with DISA (Appendix 2, A. Configuration 1. Trk/Line Data, Trunk Data, Ans with DISA). Once the trunk is seized, the Norstar system provides stuttered dial tone requesting COS password entry.

NORSTAR ENHANCED RESTRICTIONS

- **Definition**

DR3 and earlier restrictions and overrides have been reworked to provide enhanced functionality in conjunction with the new trunking options (E&M Tie Trunks, DID, DISA).

DR4 Enhanced Restrictions introduces a new term - "Exceptions" which replaces overrides.

In the past, two separate restriction and overide tables were maintained. DR4 replaces the separate tables with Filters (new DR4 term). A Dialing Filter contains restrictions and associated exceptions.

A Dialing Filter may be applied to (1)lines, (2) sets (3) a line on a set or (4) COS.

- **Benefit**

The DR4 rework of restrictions and overrides focuses on providing an easier method for administering restrictions, which can be applied to particular levels of service provided to a user.

- **Installation Details**

Dialing Filters are configured in "Capabilities" and each filter is comprised of restriction and exception entries. Both types of entries are programmed to the same table (Fig 16.0).

DIALING FILTERS
EXAMPLES

B. Administration
5. Capabilities
Dialing Filter

Dialing Filter 00: Unrestricted (Filter is unchangeable)

<u>Dialing Filter 01:</u>

Restriction 01: 1	Exception 001: 1-819
	002: 1-514
Restriction 02: 0	Exception 001: 0-819
	002: 0-514

<u>Dialing Filter 02:</u>

Restriction 01: 1	Exception 001: 1-613
Restriction 02: 0	Exception 002: 0-613

<u>Dialing Filter 03:</u>

Restriction 01: 1	Exception 001: 1-403
	002: 1-306
Restriction 02: 0	Exception 001: 0-403
	002: 0-306

<u>Dialing Filter XX</u>
Restriction 01:

Restriction 48:
(Maximum)

Dialing Filters 01, 02, & 03 contain 16 entries which leaves a balance of 384 entries to be used in other Filters.

FIG 16.0

After defining a grouping of restrictions and exceptions (Dialing Filter), the filter can now be applied to (1.) Set (Appendix 2, B. Administration, 5. Capabilities, Set Abilities, Set Filter (2.) Line on a set) (B. Administration, 5. Capabilities, Set Abilities, Line/set filter). (3.) An External line (Appendix 2, B. Administration, 5. Capabilities, Line Abilities, Dial Filter), or (4.) as part of a class of service definition (Appendix 2, B. Administration, 5. Capabilities, COS passwords).

DR4 supports a maximum of 100 Dialing Filters, (indexed from 00-99). Within one Filter a maximum of 48 restriction entries are allowed (Fig 16.0). There is no limit on the number of exception entries for a given restriction other than the total sum of the number of restrictions & exception entries for all filters must be less than or equal to 400.

- **Example**

Fig 17.0 shows how the Dialing Filters can be applied. In the example, Dialing Filter 01 from Fig 16.0 has been applied to the set (Set Filter), Dialing Filter 03 has been applied to line 1 (Line Abilities), and Dialing Filter 02 has been applied to the Line/Set Filter for line 5 of the set. Only one filter can be assigned to a line, set, or line on a set.

REMOTE ACCESS FILTER APPLICATIONS

- **Definition**

Filters can also be programmed to restrict Remote users to a particular level of service.

If a Remote User was to gain Access to the Norstar System by using "DISA", the Norstar would return stuttered dial tone. This is a request to the Remote User to enter a Class of Service (COS) password which has been defined in Norstar programming (Appendix 2, B. Administration, 5. Capabilities, COS Passwords). Using the Filters, different levels of Remote Capabilities may be configured.

- **Benefit**

Remote Users, (eg. Sales, Warehouse and the President) require different levels of service. This is accomplished by defining COS Passwords associated with appropriate capabilities.

- **Example:**

A Remote User dials the trunk associated with DISA and is returned stuttered dial tone. The user dials in his COS Password and now has the defined capabilities. (Example uses Filters from Fig 16.0).

ENHANCED RESTRICTIONS

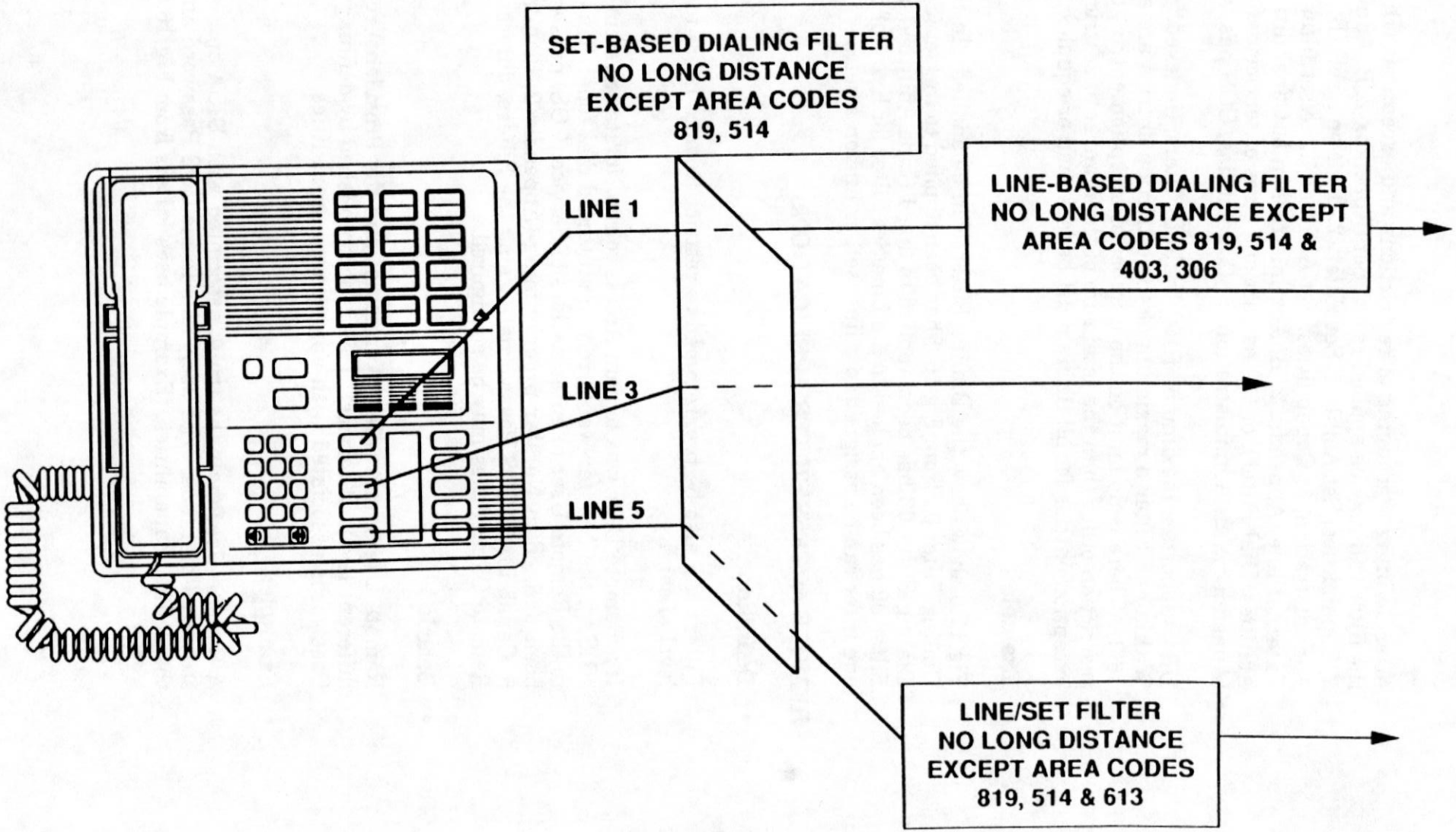


FIG 17.0

B. Administration
5. Capabilities
COS Passwords - 02 (6 digit Password)
USER FILTER: 01
LINE FILTER: 03
REMOTE PKG: 01

The Remote Package assigned to COS 02 is defined in 5. Capabilities, REM Access Pkgs, and determines to which line pools or features the Remote User has access.

B. Administration
5. Capabilities
REM ACCESS PKGS
REMOTE PKG 01
LINE POOL: POOL A
POOL B
REMOTE PAGE: YES

In this example, the Remote User (Fig 18.0) has access to Line Pool A & B and remote paging, but is restricted to long distance except area codes 819, 514, 403 and 306.

NOTES:

With DR4, the number of Line Pools has been increased from 9 to 15. Since it is desirable to assign E&M trunks (Tie lines) to a line pool, the total number of line pools has been increased to accommodate this requirement. Line pools are referenced by the first 15 letters of the alphabet.

SELECTIVE LINE REDIRECTION (External Call Forward)

- **Description**

The Selective Line Redirection feature allows any user to redirect incoming calls of one or more external lines to external (only) destinations. Redirection can be performed for any lines with assigned appearances at the Norstar station being used. A redirect ring (ring Splash) may be programmed as a reminder at any ringing appearances of the line that the line has been redirected.

- **Benefit**

Calls may now be redirected to destinations external to the Norstar. Calls at night time could be forwarded to an Answering Service or a branch office attendant could have all incoming calls forwarded to head office.

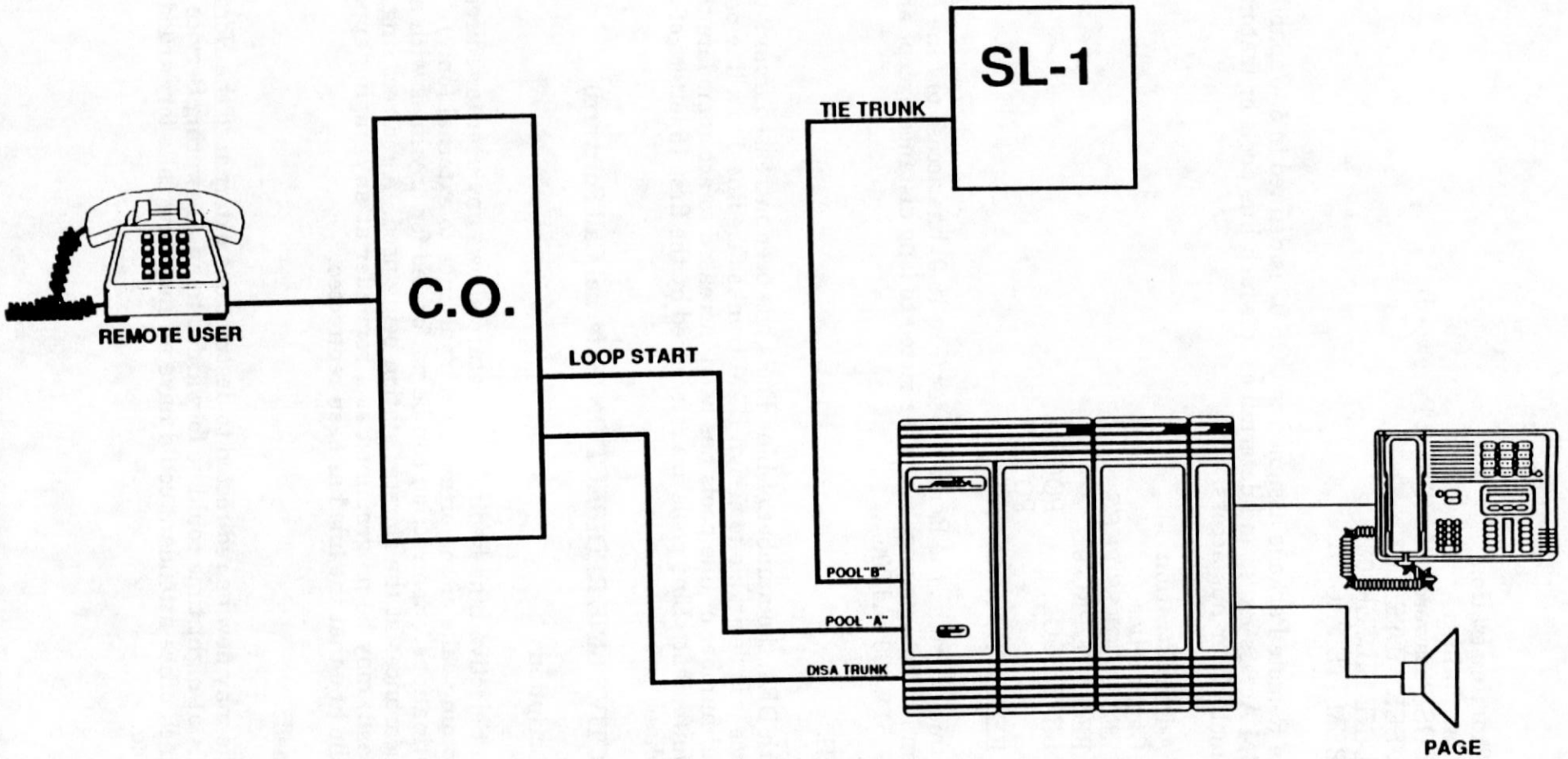

SL-1
TIE TRUNK
C.O.
REMOTE USER
LOOP START
POOL "B"
POOL "A"
DISA TRUNK
PAGE

FIG 18.0

- **Feature Details**

  In order to be redirected, the incoming line(s) must have disconnect supervision. Once a line is redirected, any calls arriving on that line can not be answered anywhere within the system. Only one user may be active specifying lines to redirect, and their destinations at any one time. Lines may be redirected to external destinations only. Redirecting (ring splash; a 200 mS burst of ringing) may be programmed to sound at every station with a ringing appearance of the redirected line. (Appendix 2, B. Administration, 5. Capabilities, Set Abilities, Redirect Ring)

- **End Users View**

  External Line Redirection re-routes all incoming (external) calls, including target lines, to external destinations. While a call is being redirected by the Norstar, the two line key indicators involved (incoming and outgoing) appear solid. When a call is not being redirected on the line, the line is available for normal outgoing use.

  The general procedure is (1) invoke the feature, either by pressing Feature 84 or a programmed key (2) select an outgoing facility (line or line pool) (3) enter the external destination phone number (4) press the line(s) to be redirected (or press the "All" soft key).

  To cancel redirection, the user would press Feature #84.

- **Example**

  Fig 19.0 and 20.0 show different External Line Redirection Applications.

UNSUPERVISED CONFERENCE (External Transfer from Conference)

- **Definition**

  This feature enables a Norstar station to conference two external destinations together and, upon disassociation from the call, allow the two external lines to remain connected.

- **Benefit**

  Conference calls are often established with two lines external to the Norstar system. External Transfer allows the Norstar user to disassociate from the call while the two external lines remain connected. This results in an increase of efficiency for the Norstar user such that when finished participating in the conference, may drop out and let the external parties remain connected. This means the Norstar user that has dropped out does not have to monitor the external parties; when they are finished disconnect supervision will drop the lines.

SELECTIVE LINE REDIRECTION

- Allows incoming calls on a line to be redirected over another line to a private network destination

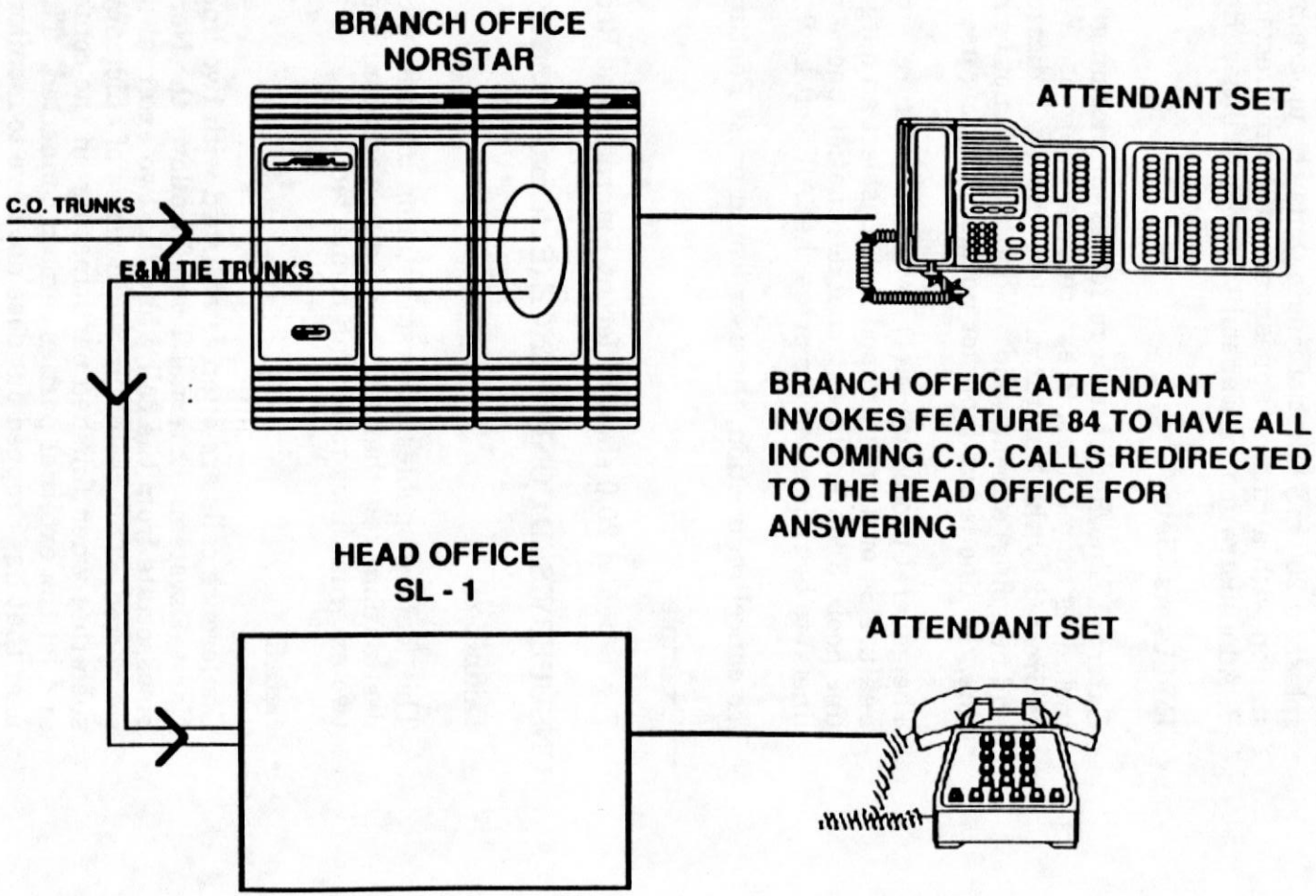


FIG 19.0

SELECTIVE LINE REDIRECTION

- Allows incoming calls on a line to be redirected over another line to a public network destination

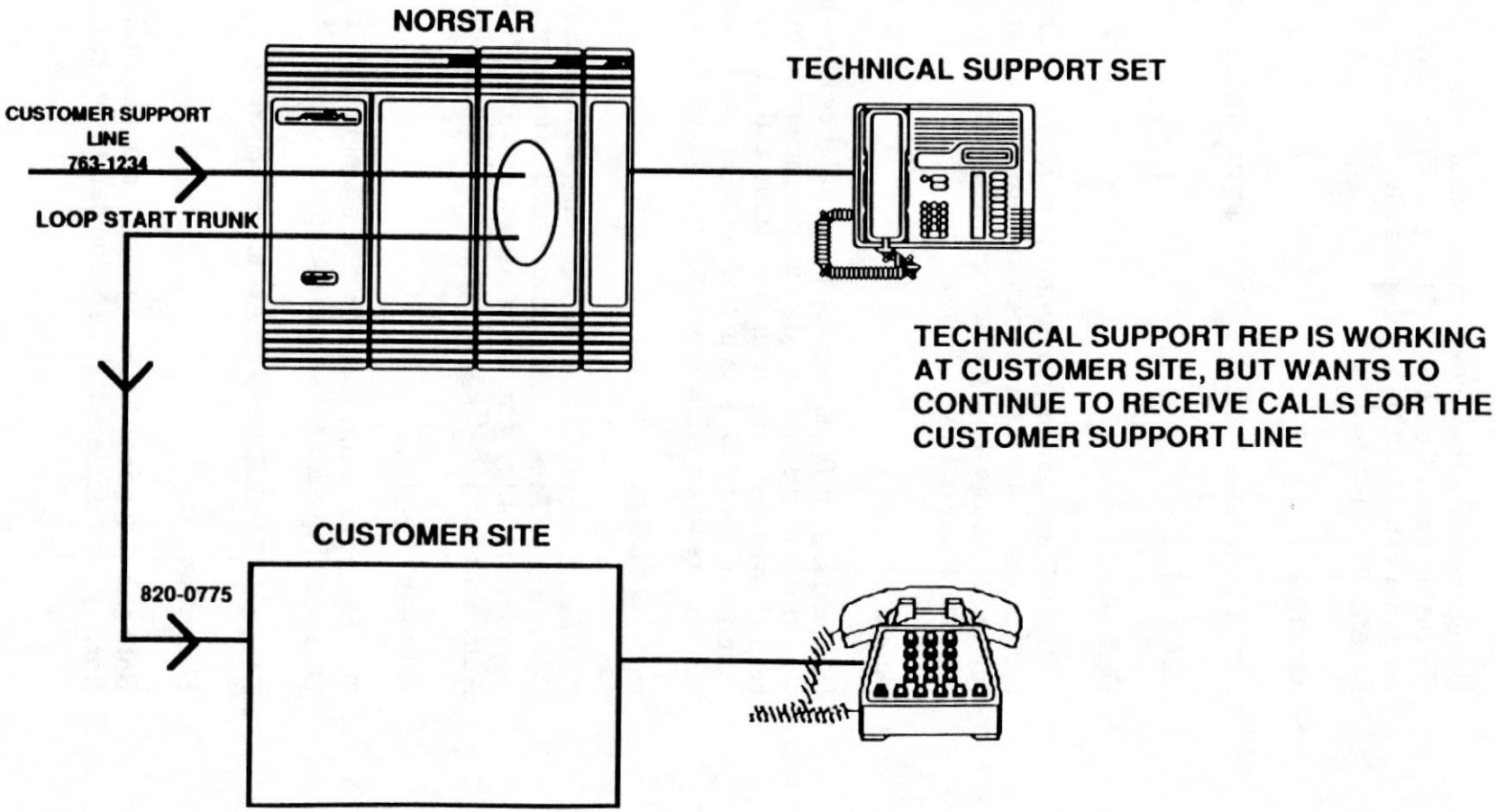


FIG 20.0

- **End User View**

  Unsupervised conference is intended to look no different from the "Transfer From Conference" feature. The "Transfer" soft key appears only in a valid situation and gives the user the opportunity to make an External Conference.

- **Example**

  Fig 21.0 shows a typical scenario for an Unsupervised Conference.

DIRECT DIAL - "0"

- **Definition**

  With DR3 and earlier, the number of Dial - "0" sets are restricted to one per system. This limit is increased to five. Coincident with this capability, is the ability to assign each station in the Norstar system to any one of these Dial - "0" sets.

- **Benefit**

  Directed Dial - "0" introduces the capability to de-load attendants in situations where one position is insufficient to meet the demand resulting in lost calls or unacceptable call processing. The increased number of Dial - "0" sets provides the ability to assign dedicated attendants to an office environment consisting of several departments.

- **Feature Details**

  The five Direct - "Dial" sets are programmed in Administration, 4. Direct-Dial. To assign a Norstar station to a particular Dial - "0" set, the appropriate entry would be programmed in Direct Dial: (Appendix 2, B. Administration, 5. Capabilities, Set Abilities, Direct Dial:).

- **End User View**

  The Norstar station user can dial a single digit to call an assigned Direct Dial set. Fig 22.0 shows an example of Direct Dial usage.

FLEXIBLE NUMBERING PLAN EXTENSIONS

- **Definition**

  Both the Attendant Direct Dial - "0" and the Call Park Prefix code can be flexibly Administered. The value can be programmed toe "NONE" and 0 through 9.

UNSUPERVISED CONFERENCE

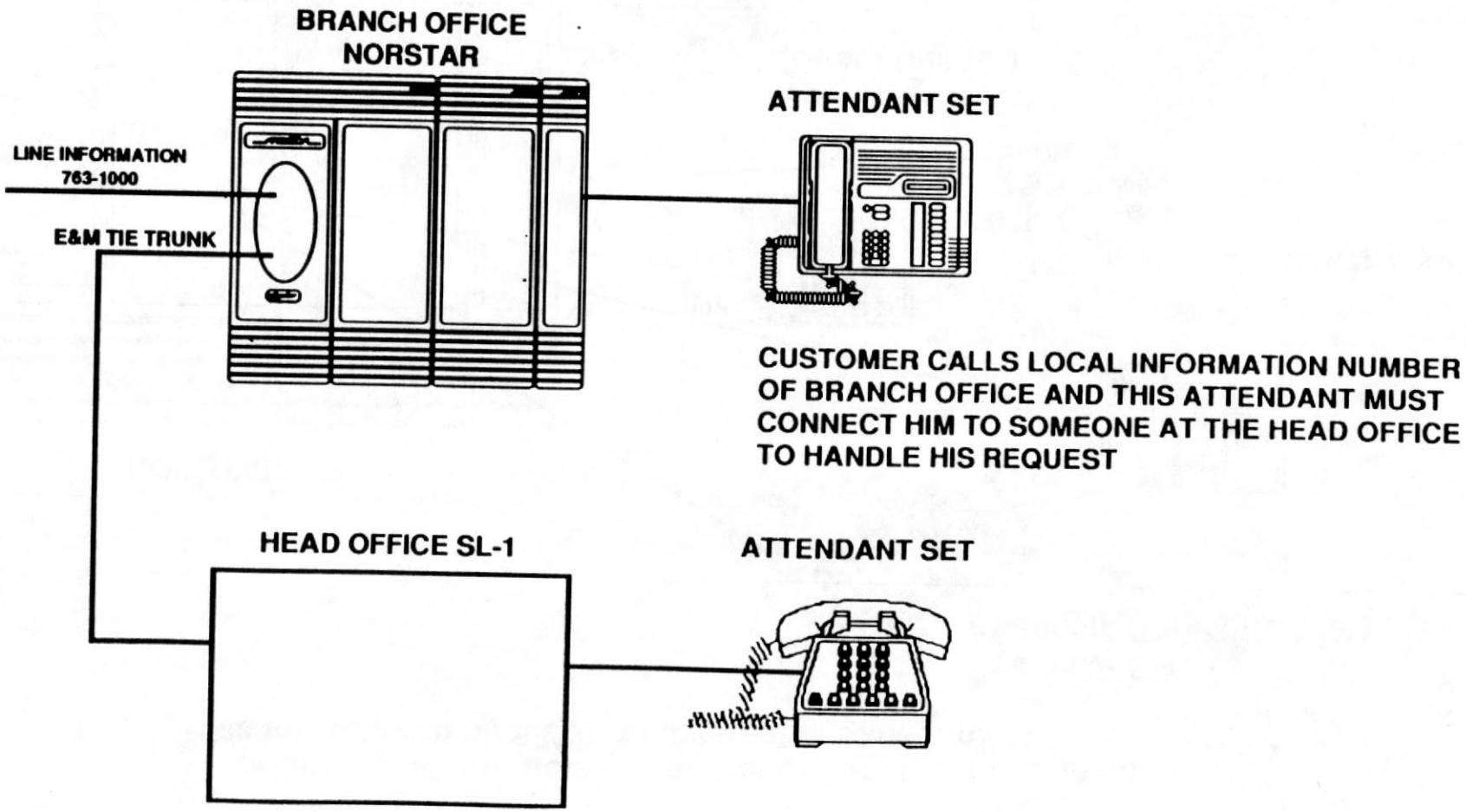


FIG 21.0

DIRECT DIAL - "0"

- Five Direct Dial - "0" sets are supported for layer installation
- Station sets can direct "0" to different destinations

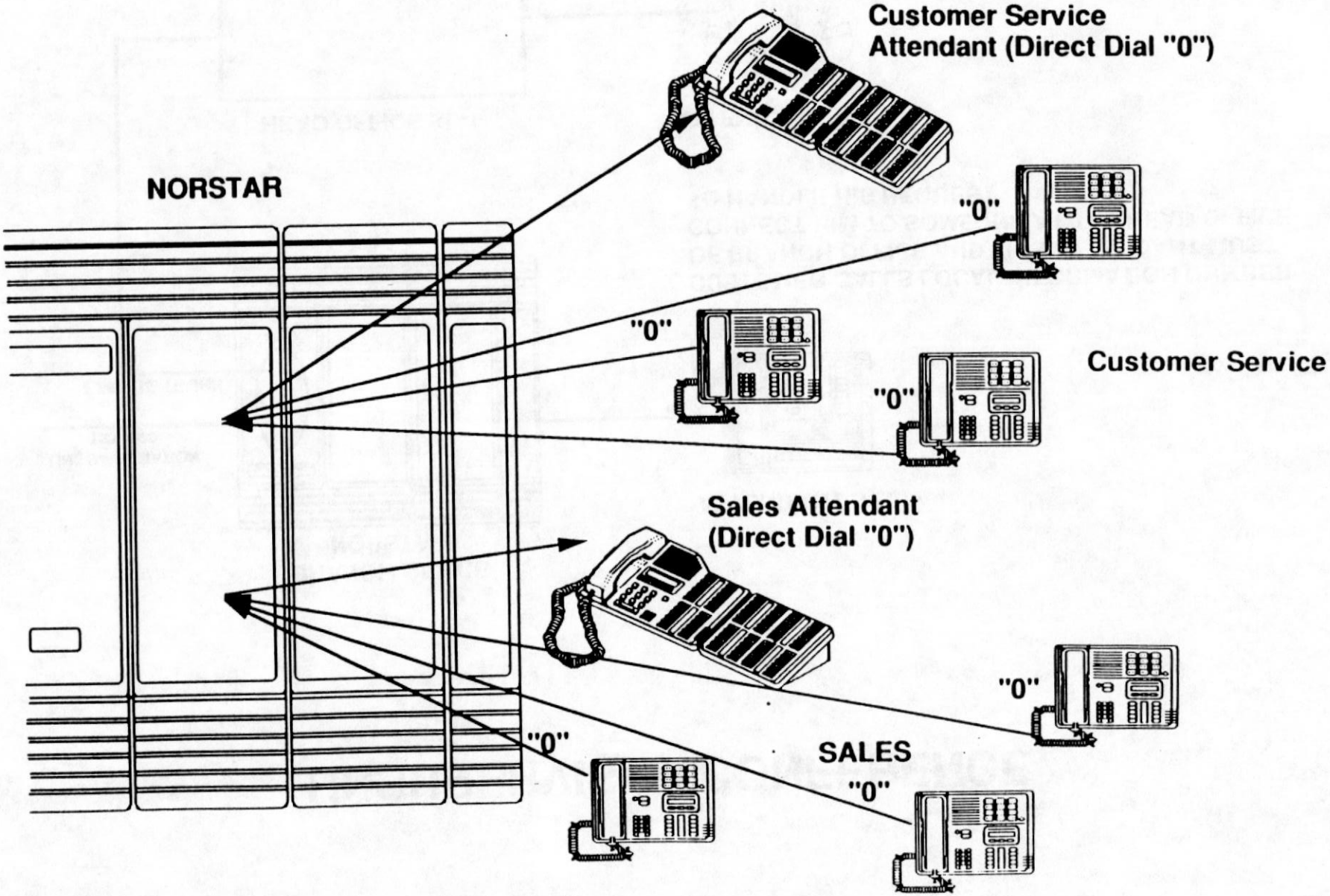


FIG 22.0

- **Benefit**

  An administrable code can be used to avoid conflict with other features accessed via the numbering plan, such as line pool access codes and DNs.

- **Feature Details**

  The Attendant Digit is defined on a system wide basis in Configuration (Appendix 2, A. Configuration 4. Miscellaneous, Direct-Dial#:).

  The Call Park prefix is defined on a system wide basis in Configuration (Appendix 2, A. Configuration, 3. Call Handling, Park prefix).

INSTALLER DETAILS

- Modular DR3 to DR4 software upgrade

  - single step upgrade procedure
  - no loss of programming except for restrictions

- Modular DR2 to DR4 software upgrade

  - Two stage upgrade procedure

  1. Upgrade Modular DR2 to DR3
  2. Upgrade Modular DR3 to DR4

  - no loss of programming except restrictions.

Norstar Programming Overview — Appendix 1 — Modular DR3 — Date Ma

I.T.A.S., Business Products Division, Calgary, Alberta

A. Configuration

1. Line Data — Show Line (1 to 80)

- Type — Public / Private to:(any DN#) or Pool:(1to9)
- Trunk mode — Super / Unsupr
- Dial mode — Pulse / Tone
- Aux. Ringer — Yes / No
- Full AutoHold — No / Yes
- Auto privacy — Yes / No
- Prime Set — 221 / (None or any DN #)

2. Line Access — Show Set (DN)

- Line Assignment — 1 to 80 / ADD or REMOVE Lines
- Answer DN's — (None or any DN #) / max. 4 Answer DN's/set
- Ringing Lines — Lines & Answer DN's:Ring or No Ring
- Pool Access — None / Pool 1 to 9:No or Yes
- Intercom keys — 2 / 0, 1, 3, 4, 5, 6, 7, 8
- Prime Line — None / I/C, Pool, Line (If Assigned)

3. Call handling — Show

- Held Reminder — No / Yes
  - Remind Delay [if HLR = Yes] — 60 sec. / 30, 90, 120, 150, 180
- DRT To Prime — Yes / No
  - DRT Delay [if DRT = Yes] — 3 rings / 1, 2, 4, 5, 6
- Trnsfr Callbck — 3 rings / 4, 5, 6, 12
- Park Timeout — 45 sec. / 30, 60, 90, 120, 150, 180
- Camp Timeout — 45 sec. / 30, 60, 90, 120, 150, 180
- Directd Pickup — Yes / No
- On Hold — Tones / or Music or Silence

4. Miscellaneous — Show

- Backgrnd music — No / Yes
- Dial-0 Set — 221 / (None or any DN #)
- Alarm set — 221 / (None or any DN #)
- CAP assignment — CAP 1 to 5: (None) / (any DN #)
- Link Time — 800 ms. / 100 to 1000 steps 100
- Set relocation — No / Yes
- Hoot delay — 1000 ms. / 200 to 2000 steps 200
- Supervision — 480 ms. / 60, 100, 260, 600
- External Code — 9 / 0 to 9 (as available)
- Line Pool Codes — 1:xxxx / Pool 2 to 9 (4 digits max.)
- Installer Pswd — CONFIG max 6 digits

5. Change DNs — Show

- Individual DN's — Old DN: (any DN #) / New DN: (any DN #)
- DN Length [default 3 chars with expansion] — 2 Char's / 3 to 7 Char's

B. General Admin

1. System Speed Dial — Show (1 to 70)

- Number — No Number — (max. 24 digits)
- Use prime line — Use line, pool code
- Display digits — Y / N
- Name — No Name — 16 Char's
- Bypass restrn — N / Y

2. Names — Show

- Set names — Show set (DN) / max. 7 chars
- Line names — Show line (1 to 80) / max. 7 chars

3. Time & Date — Show

- Time — HH : MM
- Change — Hour HH; Minutes MM
- Date — DD MMM YY
- Change — Year YY; Month MM; Day DD

4. Restrictions — Show

- Table Entries — Show — 1 to 30 (8 digits)
- Applied to Lines — Show line (1 to 80)
  - Copy from: to DN: — Restriction — N or Y
- Applied to Sets — Show set (DN)
  - Copy from: to DN: — Restriction — N or Y

5. Overrides — Show

- Table Entries — Show — 1 to 10 (14 digits)
- Applied to Lines — Show line (1 to 80)
  - Copy from: to DN: — Override — N or Y
- Applied to Sets — Show set (DN)
  - Copy from: to DN: — Override — N or Y

6. Permissions — Show Set (DN)

- Locked — None / Partial or Full
- Full Handsfree — No / Yes
  - Auto Handsfree [only available if Full HF] — No / Yes
- HF Answerback — Yes / No
- Pickup Group — 1 / 2, 3, 4, 5, 6, 7, 8, 9, No
- Page Zone — 1 / 2, 3, 4, 5, 6, No
- Aux. Ringer — No / Yes
- Forward on busy — Forward to: None / (any DN #)
- Forward no answr — Forward to: None / (any DN #)
  - Forward Delay — 3 rings / 2, 4, 6, 10
- Hot line — None / Intml (and DN) or Extml (and 24 digit number)
- Priority Call — Yes / No

7. Service Modes — Show

- Control Sets — Show line (1 to 80) — None (any DN #)
- Name1: Night (max 7 Chars) — Show
  - Setting: Manual
    - Trunk answer — Yes or No
    - Extra-0 set — None (any DN #)
  - Change Auto
    - Start time — HH:MM
    - Stop time — HH:MM
    - Trunk answer — Yes or No
    - Extra-0 set — None (any DN #)
    - Show line (1 to 80)
    - Ringing Sets — ADD & REMOVE DN's
    - Aux. ringer — Yes or No
- Name2: same as previous mode — Evening
- Name3: same as previous mode — Lunch

8. Passwords — Show

- Admin password — ADMIN — max. 6 chars
- Restriction passwords — 0 to 99 (4 digits)

C. Set Copy

- SYSTEM Data
- SYSTEM+USER
  - Source DN
  - Destination DN's

D. Maintenance

1. System Version — Show

- SP: [illegible]
- RTP: [illegible]

2. Port/DN Status

- Show Port — 101 to 516 or DN
  - Version
  - State — Disable or Enable
  - >B2

3. Module Status

- Show Module — [illegible]
  - Version
  - State — Disable or Enable
  - No of Lines on module
  - No of Sets on module

4. Diagnostics

- Enter Test #
  - Run test on Ports
  - Run test on Modules
  - Disable at Idle
  - Disable at Once
  - Display Results
  - Cancel Test

5. System Test Log

- Alarm: Code
- Erase Log
- Date & Time
- Next Repeat

6. System Admin Log

- Alarm: Code
- Erase Log
- Date & Time
- Next Repeat

New or Enhanced feature over DR2 software

NMDR3PC[illegible]30 A

Norstar Programming Road Map
I.T.A.S., Business Products Division, Calgary, Alberta

Appendix 2 **Modular DR4**

A. Configuration

1. Trk/Line Data — Show Line (1 to 184)
   - If entry is 81-184 (Target Lines) — Show
     - Received # — XXXXXXX
   - If entry is 1-80
     - Trunk Data — Show
       - Line XXX: — Loop / DID or E&M (E&M has 2 DTMF receivers)
       - Trunk mode — Super / Unsupr
       - If Super / If E&M / If DID
         - Ans mode — Manual / Auto
         - Ans with DISA — Y / N
         - Signal — Wink/Start / Immediate or Delay Dial
         - Gain — Normal / High
       - Dial mode — Pulse / Tone
       - Full AutoHold — No / Yes
     - Line Data — Show
       - Line type — Public / Private to (any DN#) or Pool (A to O)
       - Prime Set — 221 (None or any DN #)
       - Aux. ringer — Yes / No
       - Auto privacy — Yes / No
2. Line Access — Show Set (DN)
   - Line Assignment — 1 to 184 / ADD or REMOVE Lines
   - Answer DN's — (None or any DN #) / max. 4 Answer DN's/set
   - Ringing — Lines & Answer DN's Ring or No Ring
   - Line pool access — None / Pool A to O No or Yes
   - Intercom keys — 2 / 0, 1, 3, 4, 5, 6, 7, 8
   - Prime line — None / I/C, Pool A to O, Line (If Assigned)
3. Call handling — Show
   - Hold reminder — N / Y
     - Remind delay (If HLR = Yes) — 60 sec. / 30, 90, 120, 150, 180
   - DRT to prime — Yes / No
     - DRT delay (If DRT = Yes) — 3 rings / 1, 2, 4, 5, 6
   - Trnsfr callbck — 3 rings / 4, 5, 6, 12
   - Park prefix — 1 / 0 to 9 or none
     - Park timeout — 45 sec. / 30, 60, 90, 120, 150, 180
   - Camp timeout — 45 sec. / 30, 60, 90, 120, 150, 180
   - Directd pickup — Yes / No
   - On Hold — Tones / or Music or Silence
4. Miscellaneous — Show
   - Backgrnd music — No / Yes
   - Direct-dial # — 0 / (None or any available digit from 0 to 9)
   - DISA DN — None / any DN, same length as Target DN
   - Auto DN — None / any DN, same length as Target DN
   - Alarm set — 221 (None or any DN #)
   - CAP assignment — CAP 1 to 5: (None) (any DN #)
   - Link time — 500 ms. / 100 to 1000 steps 100
   - Set relocation — No / Yes
   - Hoot delay — 1000 ms. / 200 to 2000 steps 200
   - Supervision — 450 ms. / 50, 100, 250, 500
   - External code — 9 / 0 to 9 (as available)
   - Line pool codes — A XXXX / Pool B to O (4 digits max.)
   - Installer pswd. — CONFIG max 6 digits
5. System Data — Show
   - Individual DNs — Old DN: (any DN #) / New DN: (any DN #)
   - DN Length — 3 Char's / (min. 3 chars with expansion Only) 4 to 7 Char's
   - Rec'd # Length — 3 Char's / (min. 3 chars with expansion Only) 4 to 7 Char's

B. General Admin

1. System Speed Dial — Show (1 to 70)
   - Number — No Number / max. 24 digits
   - Use prime line — Use line post code
   - Display digits — Y / N
   - Name — No Name / 16 Char's
   - Bypass restrn — N / Y
2. Names — Show
   - Set names — Show set (DN) / max. 7 chars
   - Line names — Show line (1 to 80) / max. 7 chars
3. Time & Date — Show
   - Time — HH MM
   - Change — Hour HH / Minutes MM
   - Date — DD MMM YY
   - Change — Year YY / Month MM / Day DD
4. Direct-Dial — Show
   - Set1 — 221
   - Set2 to Set5 — None to any DN
5. Capabilities — Show
   - Dialing Filters — Show Filter 1 to 99
     - Restr'n 01 to 48 — restriction / max. 15 digits
     - Except'n XXX — exception / max. 400 rest and exceptions/system — max. 16 digits
   - Rem access privs — Show package 01 to 15
     - Line pool access — Pool A XXXX: N / Pool A to O Yes or No
     - Remote page — N / Y
   - Set abilities — Show Set (DN)
     - Set filter — 02 / 00 to 99 (00 is no restrn)
     - Line set filters — Show line (assigned)
       - Filter — None / 00 to 99 (00 is no restrn)
     - Set lock — None / Partial or Full
     - Full handsfree — No / Yes
       - Auto handsfree (only available if Full HF) — No / Yes
     - HF answerback — Yes / No
     - Pickup group — 1 / 2, 3, 4, 5, 6, 7, 8, 9, No
     - Page zone — 1 / 2, 3, 4, 5, 6, No
     - Aux. ringer — No / Yes
     - Direct-dial: — assign Direct Dial sets — None / Set1 to Set5
     - Forward on busy — None / (any DN #)
     - Forward no answr — None / (any DN #)
       - Forward delay — 3 rings / 2, 4, 6, 10
     - Redirect ring — Y / N
     - Hotline — None / Intrnl (and DN) or Extrnl (and 24 digit number)
     - Priority call — Yes / No
   - Line abilities — Show line
     - Line filter — 03 / 00 to 99 (00 is no restrn)
     - Remote filter — 04 / 00 to 99 (00 is no restrn)
     - Remote pkg — 05 / 00 to 15
   - COS passwords — Show password 00 to 99
     - Pswd XX — XXXXXX / 6 digits
       - User fltr — Dflt / 00 to 99 (00 is no restrn)
       - Line filter — Dflt / 00 to 99 (00 is no restrn)
       - Remote Pkg — Dflt / 00 to 15
7. Service Modes — Show
   - Control Sets — Show line (1 to 184) / None (any DN #)
   - Name1: — Night (max 7 Chars) — Show
     - Setting: Manual
       - Trunk answer — Yes or No
       - Extra-0 set — None (any DN #)
       - Change Auto
         - Start time — HH:MM
         - Stop time — HH:MM
         - Trunk answer — Yes or No
         - Extra-0 set — None (any DN #)
         - Show line (1 to 184)
         - Ringing Sets — ADD & REMOVE DN's
         - Aux. ringer — Yes or No
   - Name2: — same as previous mode — Evening
   - Name3: — same as previous mode — Lunch
8. Passwords — Show
   - Admin password — ADMIN max. 6 chars

C. Set Copy

- SYSTEM Data
- SYSTEM+USER
  - Source DN
  - Destination DN's

D. Maintenance

1. System Version — Show
   - SP — 30GEC xx
   - RTP — 30GBC xx
2. Port/DN Status
   - Show Port — 101 to 816 or DN
     - Version
     - State — Disable or Enable
     - >82
3. Module Status
   - Show Module — 1 to 8
     - Version
     - State — Disable or Enable
     - No of Lines on module
     - No of Sets on module
4. Diagnostics
   - Enter Test #
     - Run test on Ports
     - Run test on Modules
     - Disable at idle
     - Disable at Once
     - Display Results
     - Cancel Test
5. System Test Log
   - Alarm Code
   - Erase Log
   - Date & Time
   - Next Repeat
6. System Admin Log
   - Alarm Code
   - Erase Log
   - Date & Time
   - Next Repeat

DR4 Programming Road Map
This form is a road map of major headings of programming in Norstar Modular Design Release 4

New or Enhanced feature over DR3 software

Mar 91 Al Jacques

CUMPRIMENTO
DE ENTRAMENTO

norstar

MODULAR DR4
TECHNICAL TRAINING COURSE

November 1991
NT CALA Corp.

UNIT 3a - CONFIGURATION PROGRAMMING

Programming features and parameters of DR4 software is performed in the same manner as programming other versions of Modular software. The following access codes are pressed on the buttons of either an M7310 or M7324 Norstar telephone set to enter into the programming mode:

Startup Programming is performed only upon initial installation after the system hardware has been powered up.

Press ƒ••ÅΠ
ƒ•••••

Default values for the 4 system startup templates may be found in Section 5 of the DR4 Installer Guide.

permitir acceso integra

Configuration Programming allows the settings for the entire Norstar System to be changed to meet individual customer requirements.

empresa. cliente.

Press ƒ••ÇØ
ƒ••

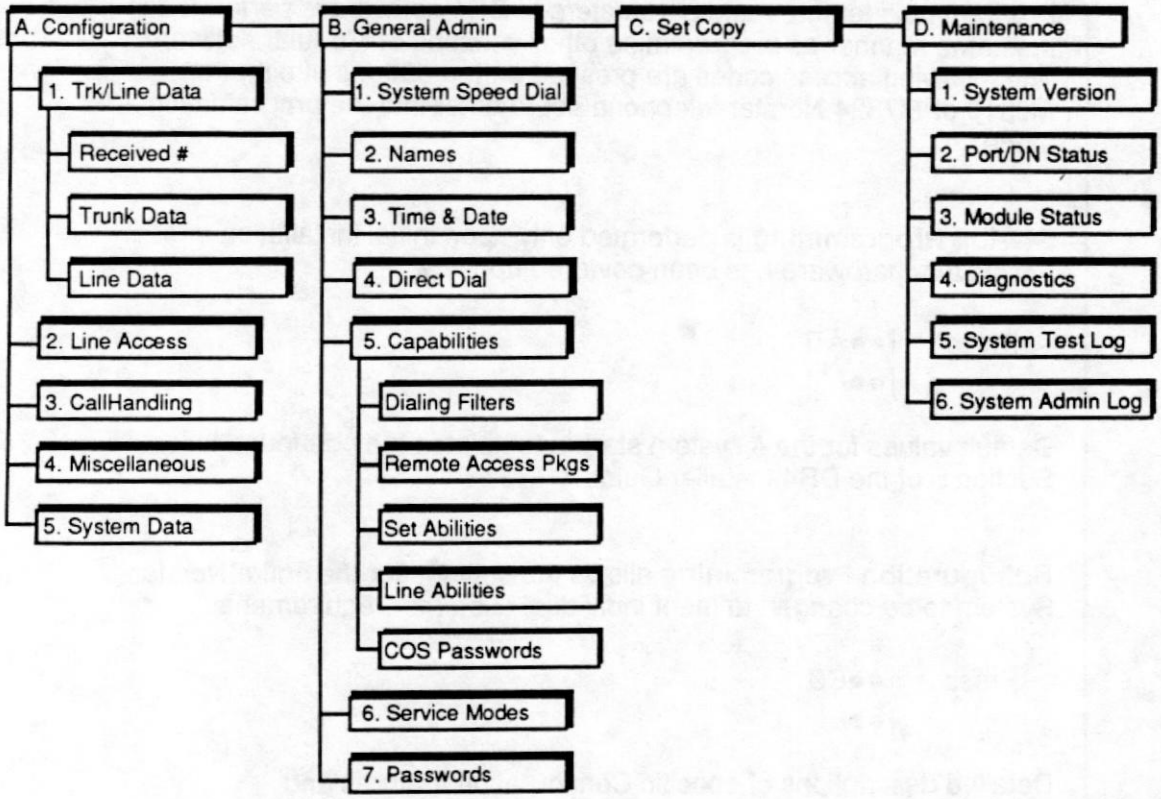
Detailed descriptions of specific Configuration features and programming instructions are given in Section 6 of the DR4 Installer Guide.

Administration Programming of DR4 is used to change settings relating to telephone set and line usage.

Press ƒ••Å
ƒ••

Detailed descriptions of specific Administration features and programming instructions may be located in Section 7 of the DR4 Installer Guide.

Norstar DR4 Programming Map



Configuration Programming (continued)

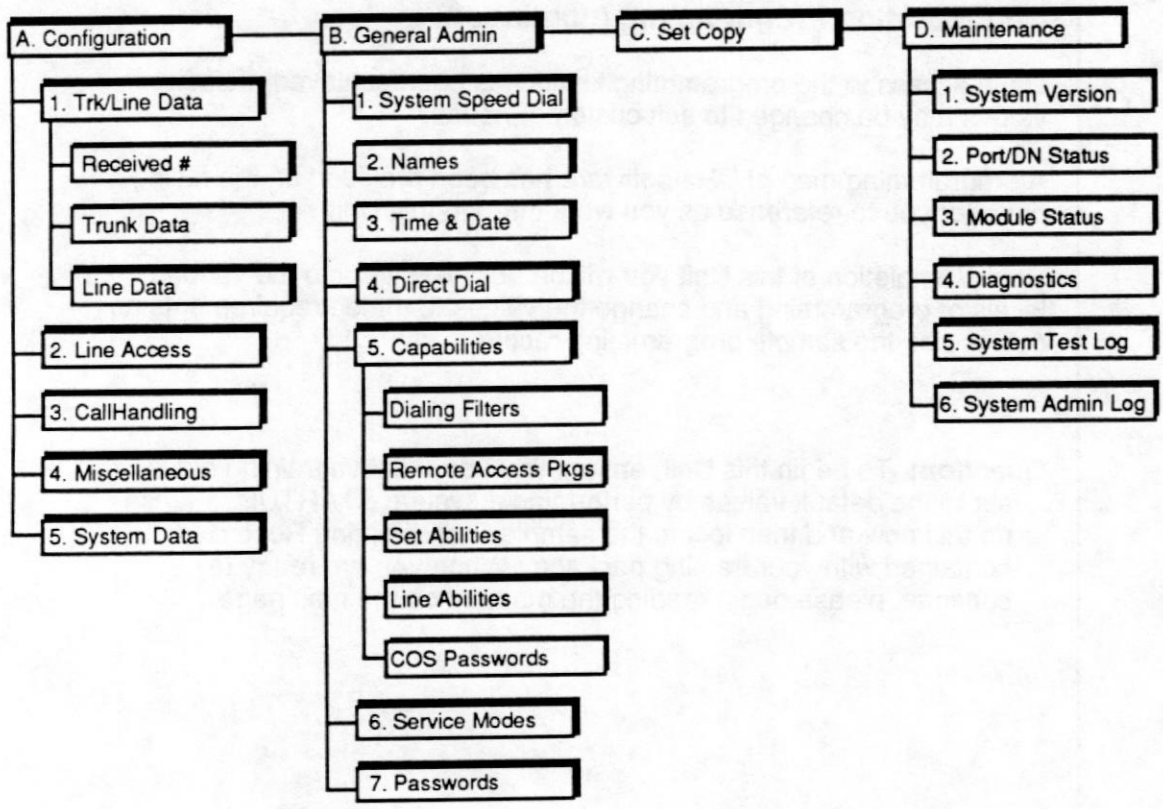
Once access to the programming levels has been achieved, default values may be changed to suit customer needs.

A programming map of DR4 software has been provided on the facing page for you to reference as you work through this Unit.

Upon completion of this Unit you will be able to enter into the various levels of programming and change the values to match requirements as outlined on the sample programming record.

Question: To begin this Unit, ensure that your captive training aid is set to the default values by performing a system STARTUP. Please do this now and then locate the sample Programming Record contained with your training package. When you are ready to continue, please begin reading the material on the next page.

Norstar DR4 Programming Map



DR4 Programming Record

The DR4 Programming Record is much the same in format as the DR2 and DR3 Programming Records.

Locate the Sample Programming Record supplied with the training package and open it to page 4.

Some of the sub-headings have been changed to reflect a new or enhanced programmable feature. For example, under the "1. Trk/Line; Trunk Data" heading a new area of programming has been added called "Rec'd #".

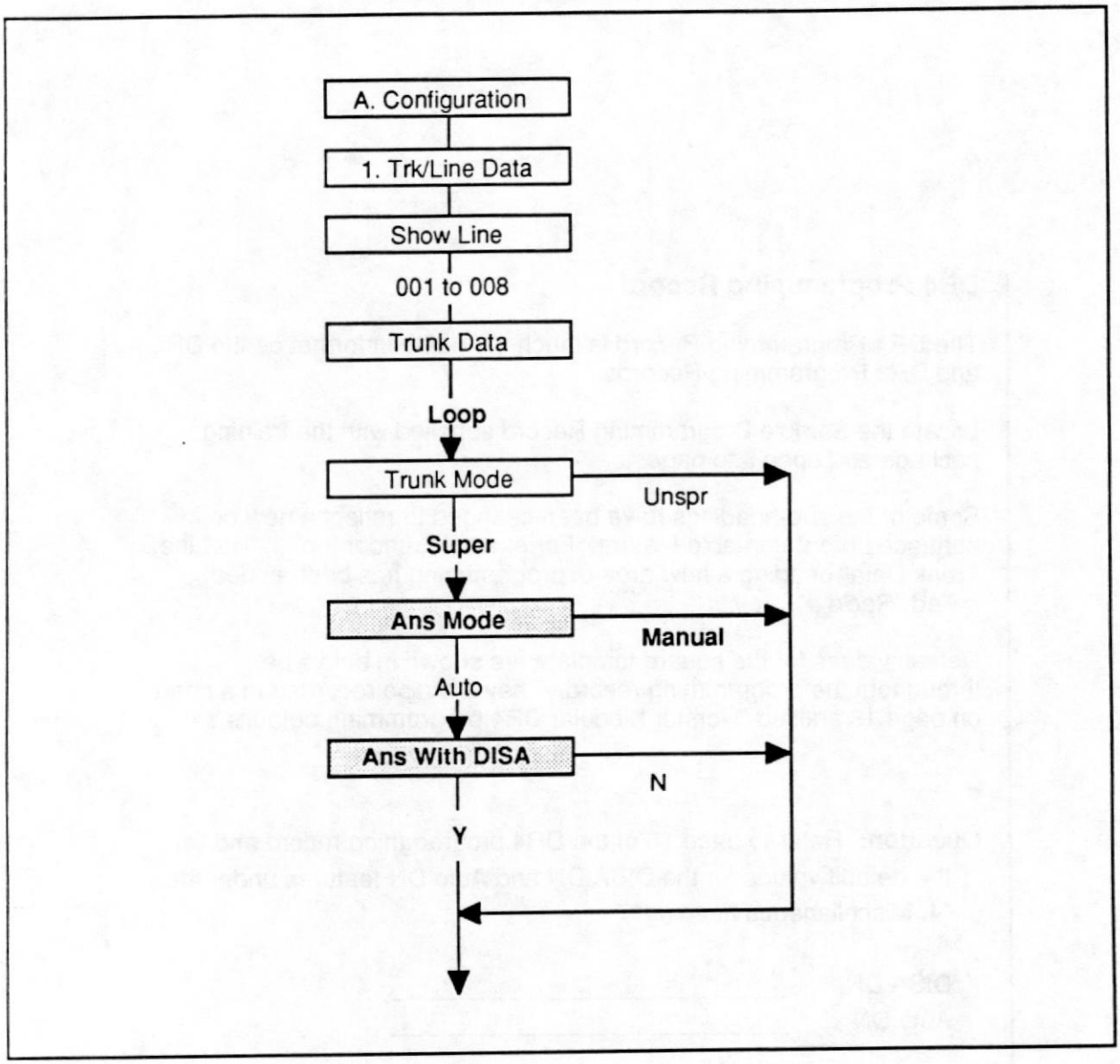
Default values for the square template are shown in bold type throughout the programming record. They are also recorded in a chart on page 16 entitled "Norstar Modular DR4 programming defaults".

Question: Refer to page 16 of the DR4 programming record and list the default values for the DISA DN and Auto DN features under the "4. Miscellaneous heading".

DISA DN _____

Auto DN _____

TRUNK PROGRAMMING CHART



Answer:

DISA DN	***None***
Auto DN	***None***

DR4 Programming Record (continued)

Some of the options shown on the DR4 programming record are dependent on a previously selected feature. For example, the "Ans Mode" option associated with trunk programming is only available when the "Trunk Mode" setting is set to "Super". If the "Trunk Mode" is set to "Unspr", programming continues with parameters associated with "Line Data".

Care must be taken to ensure that all required options are programmed.

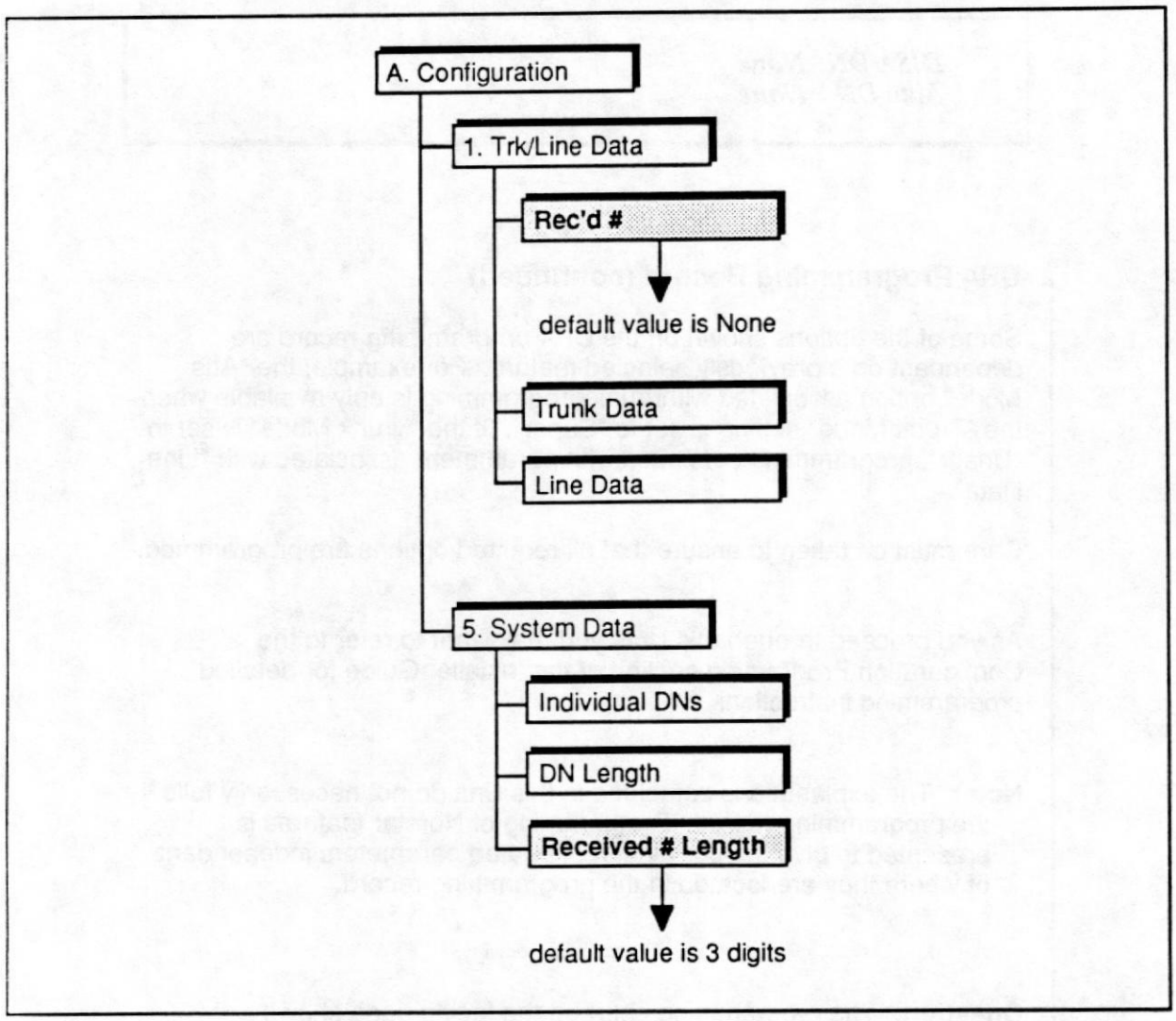
As you proceed through this Unit, you may want to refer to the Configuration Programing section of the Installer Guide for detailed programming instructions.

Note: The explanations contained in this Unit do not necessarily follow the programming record. Programming of Norstar features is presented to give the correlation of related parameters independent of where they are located in the programming record.

Question: The programming chart on the facing page shows programmable options when programming trunks. From the chart, determine the option which would not be available when the "Ans Mode" is set to manual.

_____

TARGET LINE PROGRAMMING CHART



Answer:

Ans with DISA

Target Line Programming

The first item that you will program on the course is Target Lines.

Two sections of the Programming Record are used to program target lines:

- "5. System Data - Rec,d # length" on page 6
- "1. Trk/Line Data - Rec'd #" on page 4a.

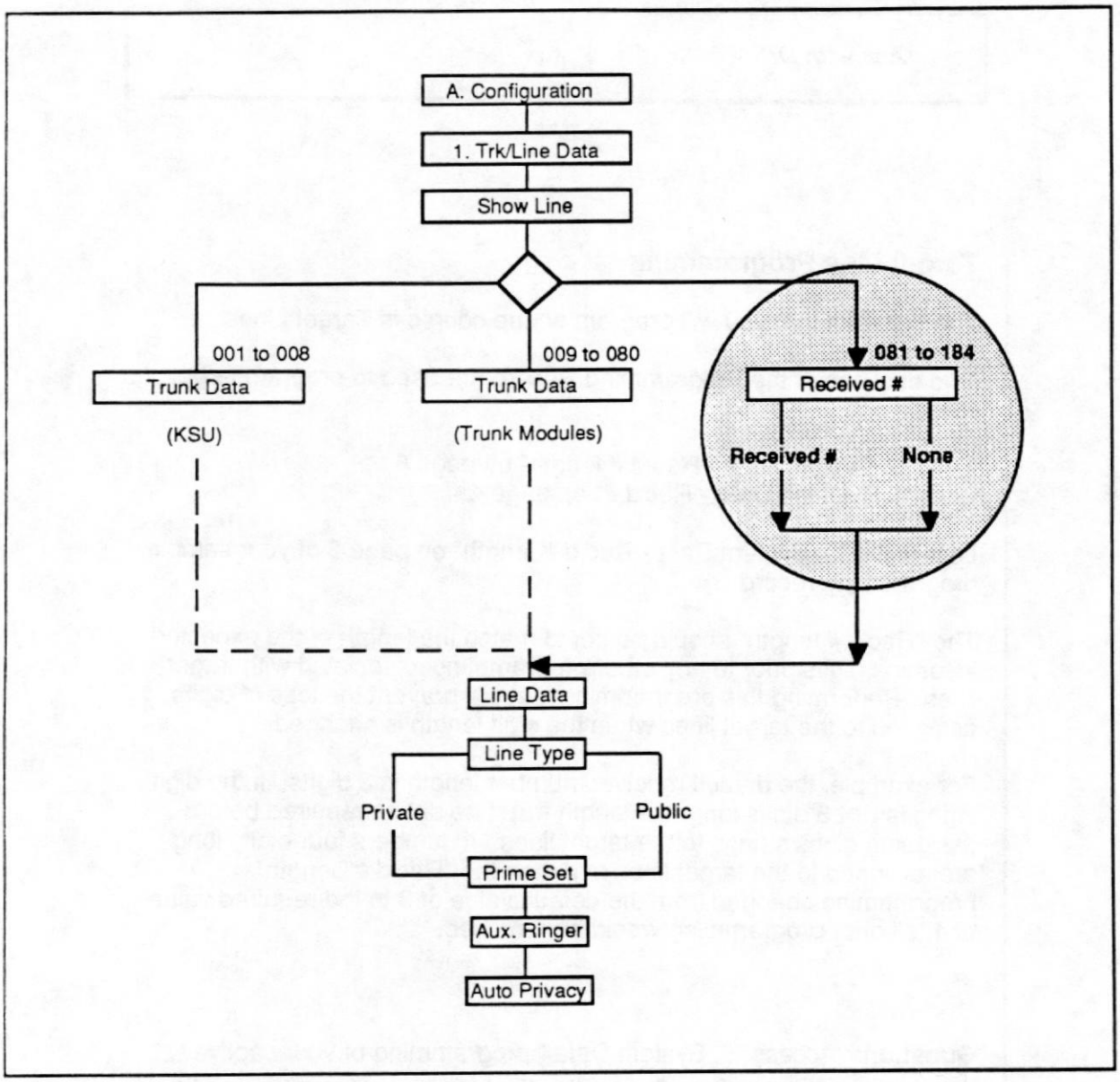
Locate the "5. System Data - Rec,d # length" on page 6 of your sample programming record.

The "Rec'd # length" should be set to match the length of the expected incoming digits prior to any other programming associated with target lines. Performing this programming first will prevent the loss of digits assigned to the target lines when the digit length is changed.

For example, the default received number length is 3 digits. If the digit string is **not** 3 digits long, the length **must** be set as required before assigning digits strings to the target lines. If numbers four digits long are assigned to the target lines and then the "Rec'd #" length" programming changed from the default value of 3 to the required value of 4, all prior programming would be removed.

Question: Access "5. System Data " programming of your captive system and enter the value for the "Rec,d #" length as shown on the bottom of Page 6, of the sample programming record.

TARGET LINE PROGRAMMING CHART



Answer:

> *You should have ensured that the default value of 3 is programmed into your captive system.*

Target Line Programming (continued)

After the received number length programming has been performed, the received numbers that make up the target line can be entered. This programming is located on page 4a of your sample programming record.

Generally, the digits assigned to a target line are selected to match the intercom numbers of a station and then the target line is assigned to that station. In this fashion callers internal to the system or external to the system can access the station by dialing the same digits. (Internal callers dial the digits on the intercom; external callers dial the digits after the system has automatically answered the trunk.)

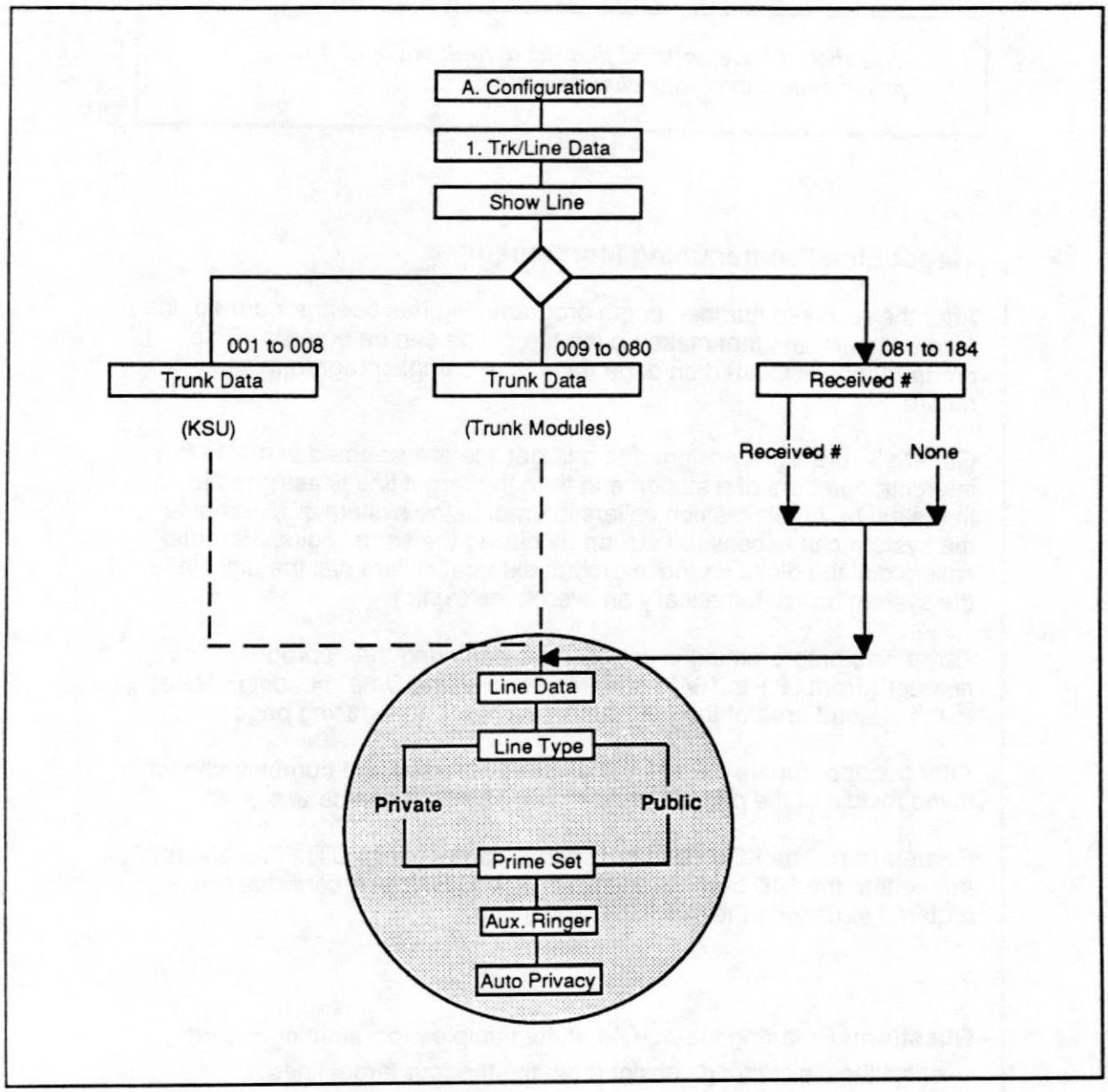
Target line programming is performed by entering the appropriate line number (From 081 to 184) under the "1. Trk/Line Data" heading. Refer to the shaded area of the programming chart on the facing page.

After the appropriate target line has been selected, the numbers shown in the middle of the page ("Rec'd #" sub-heading) can be assigned.

Remember: The KSU does not support target lines. DTMF receivers from either the DID trunk cartridge or E&M/DISA trunk cartridge are required to decode the incoming digit string.

Question: Referring to page 4a of the sample programming record, enter the digits strings assigned to the the four target lines.

TARGET LINE PROGRAMMING CHART



Target Line Programming (continued)

The shaded area of the flow chart on the facing page shows the remainder of programming for target lines.

After the "Trunk Data" information has been entered the next heading to be programmed is . Under the "Line Data" heading, the target line "Line type" must be defined either as Public or Private. The default value for "Line type" is Public.

Target lines cannot be placed into line pools.

The remaining sub-headings under "Line Data" remain unchanged from DR3 and are programmed as required.

Question: Enter the values from page 4a into your captive system for "Line Data".

List the "Line Data" sub-headings that pertain to target line programming.

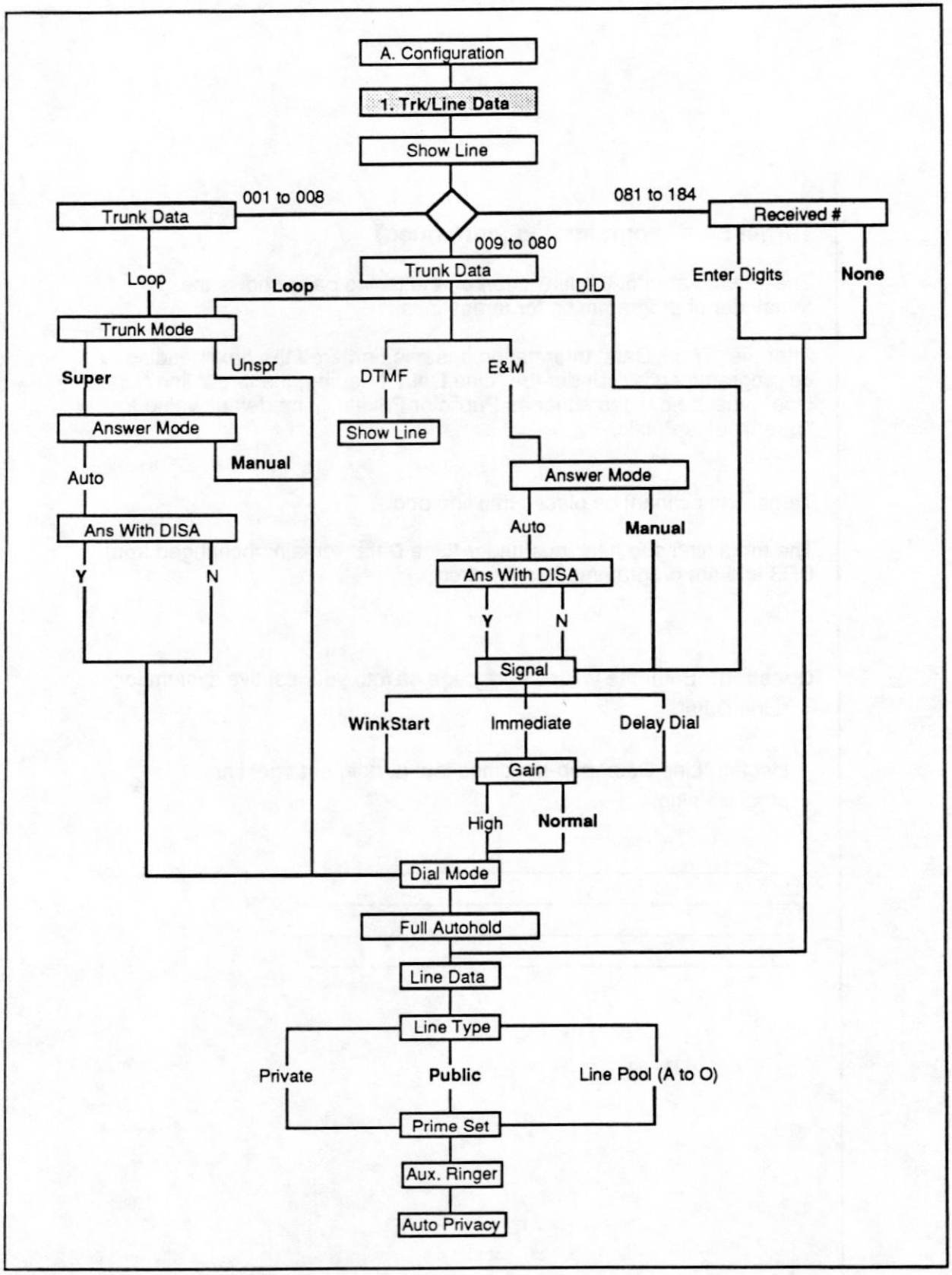
_____

_____

_____

_____

TRUNK PROGRAMMING CHART



Answer:

Line type
Prime set
Auxiliary ringer
Auto privacy

Programming Trunks

After the target lines have been defined, the next item to program is the heading "1.Trk/Line Data". This area of programming defines the parameters associated with trunks.

A programming flow chart on the facing page shows the various options and routes which may be selected when programming trunks. Default values for the options are shown in bold type.

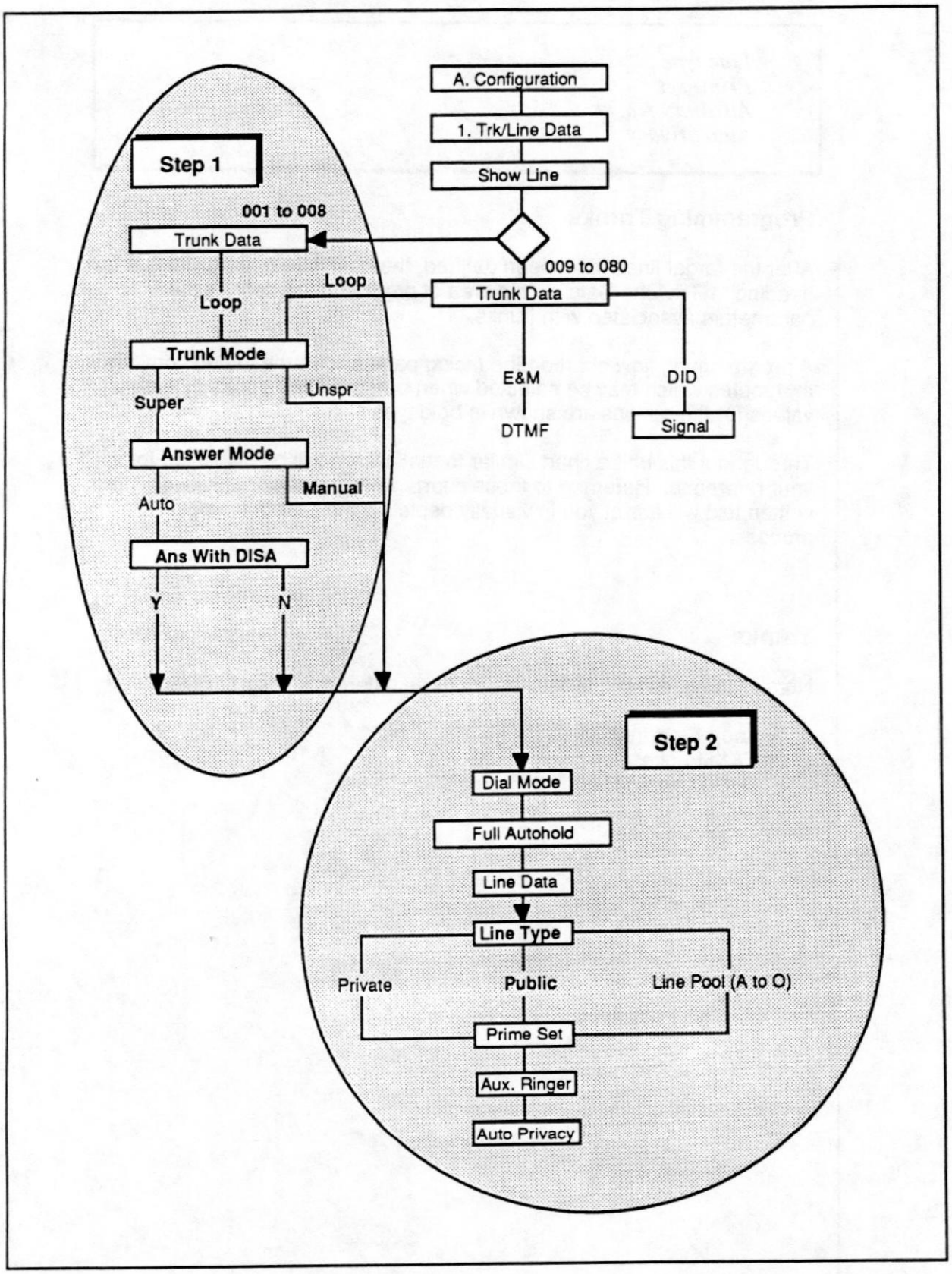
Throughout this unit a chart similar to that shown will be displayed for your reference. Referring to these charts while proceeding through the written text will assist you in visually depicting the programming process.

Trunks

Norstar provides for interfacing with three different kinds of trunks:

- Loop Start trunks
- E&M trunks
- Direct Inward Dial (DID) trunks

LOOP START TRUNK PROGRAMMING



Programming Loop Start Trunks

Programming Loop Start Trunks in association with DR4 software is basically a two step process. The first step involves defining the trunks by assigning selected parameters to the individual trunks. The second step involves assigning the trunks to the Norstar set(s) or to a line pool.

Page 4b of the sample programming record shows the programming required for a typical Loop Start trunk. Open the programming record to this page.

The page is divided into three sections: Trunk Data, Rec'd #, and Line Data. As explained previously, the "Rec'd #" section used to assign digit strings to target lines and is **not** used when programming loop start trunks.

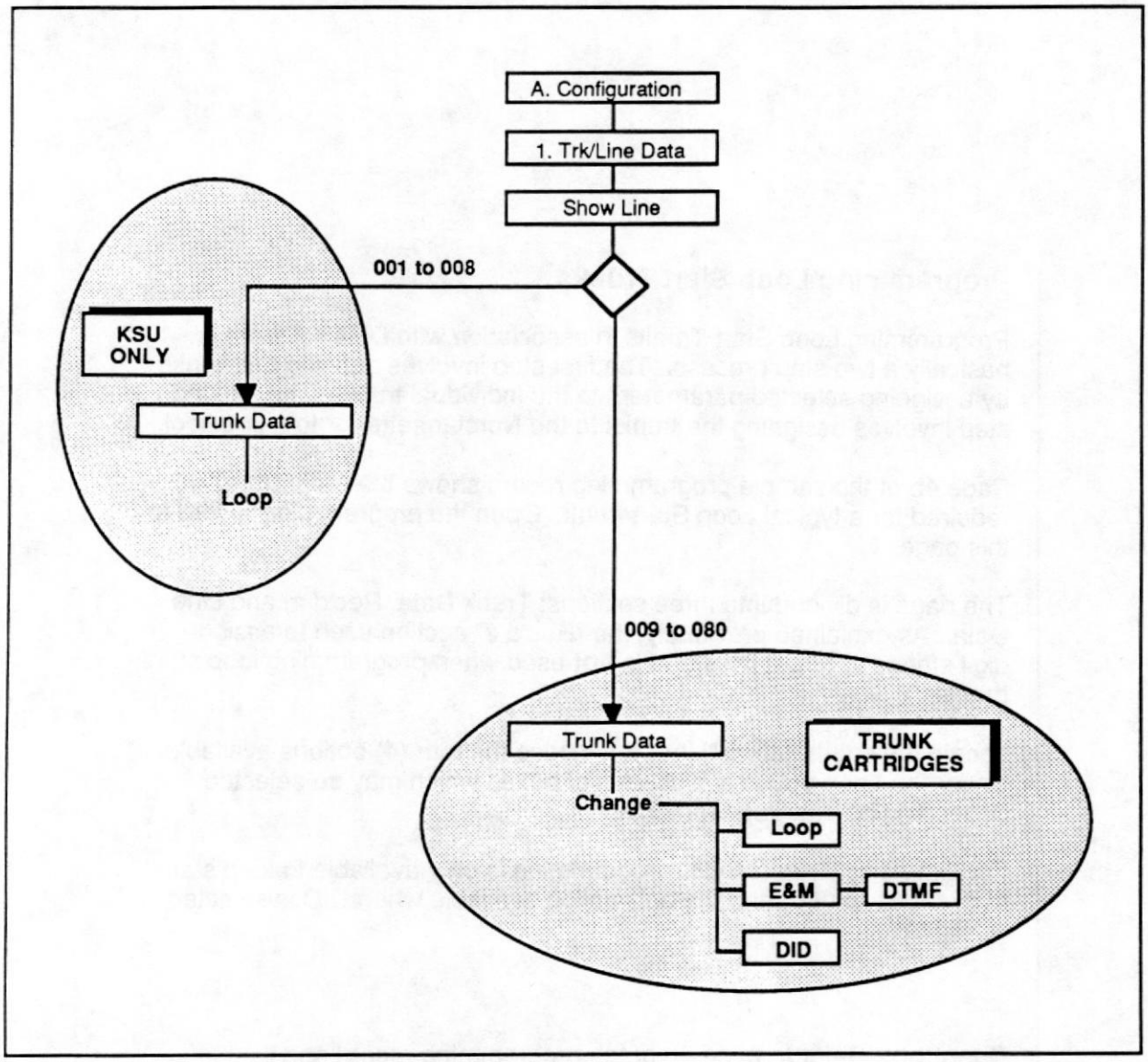
Locate the sub-heading "Line" and notice the four (4) options available. Under the Loop option is a column of boxes which may be selected depending on user requirements.

For example, "Trunk Mode" programming is only available to loop start trunks (001 to 080) and the only option available when DID is selected is "Signal".

Question: Refer to page 4b of the programming record and list the programmable parameters if DTMF is selected.

_____

LOOP START TRUNK PROGRAMMING



Answer:

When DTMF is selected, no further programming is required.

Programming Loop Start Trunks (continued)

The KSU only supports loop start trunks. Trunks which are connected to the KSU are programmed as lines 001 to 008. The "Trunk Data" programming sub-heading "Line" does not offer changeable options for lines 001 to 008. The display of the programming telephone set indicates "Loop" only; a "Change" softkey is not presented to allow selection of other line modes.

Trunks which are connected to Trunk Cartridges are programmed as lines 009 to 080. When the "Trunk Data" level of programming is accessed a "Change" softkey appears. Pressing this softkey cycles through the available options.

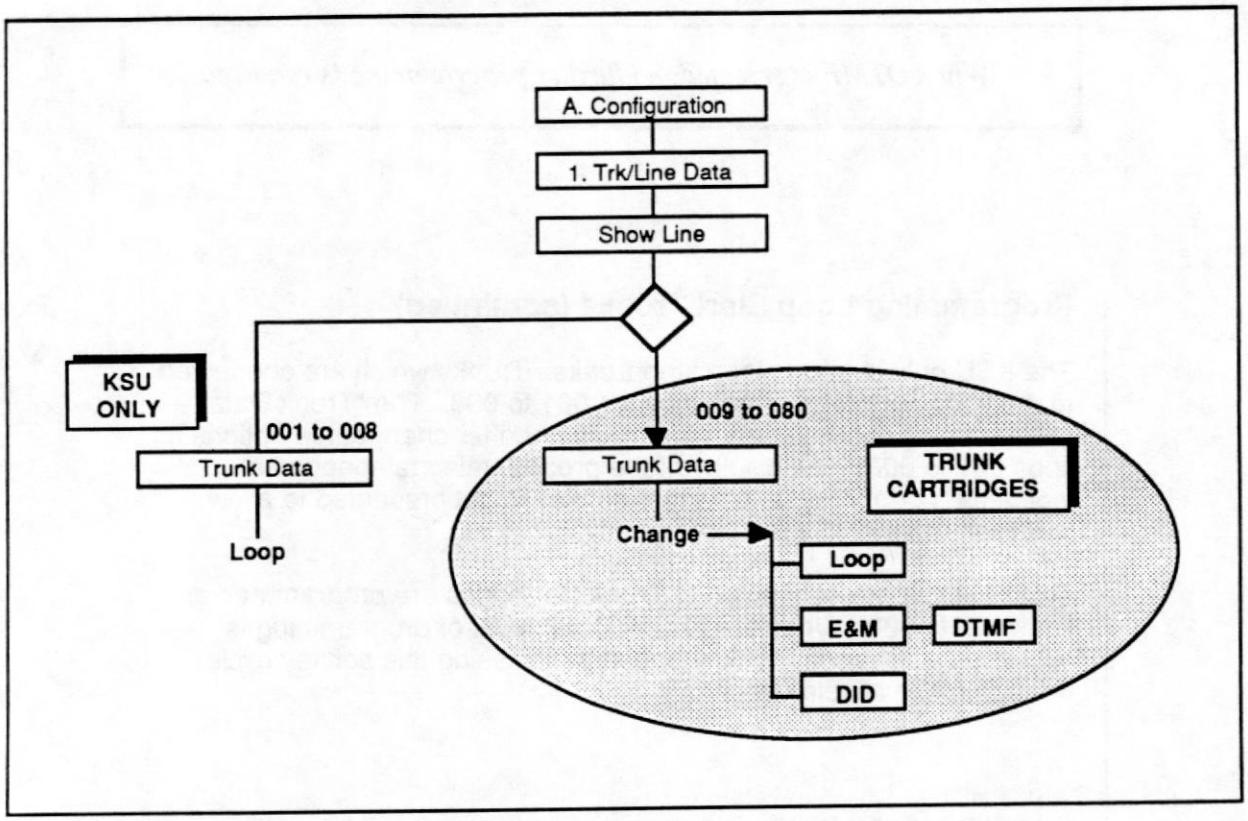
Question: Enter Configuration programming level 1.Trk/Line Data and show line 009. Using the change softkey, cycle through the options and list them in the space provided below:

_____

_____

_____

LOOP START TRUNK PROGRAMMING



Answer:

Loop, E&M, DID

Programming Loop Start Trunks (continued)

Cycling through the options for various line mode settings does not affect the current operation of the associated lines. Any lines that are associated with a trunk cartridge that has its mode changed during a programming session will be disabled upon completion of the programming session. The trunks may be re-enabled either by installing the appropriate matching hardware (trunk cartridge) or by re-entering the programming level and changing the parameter to match the hardware.

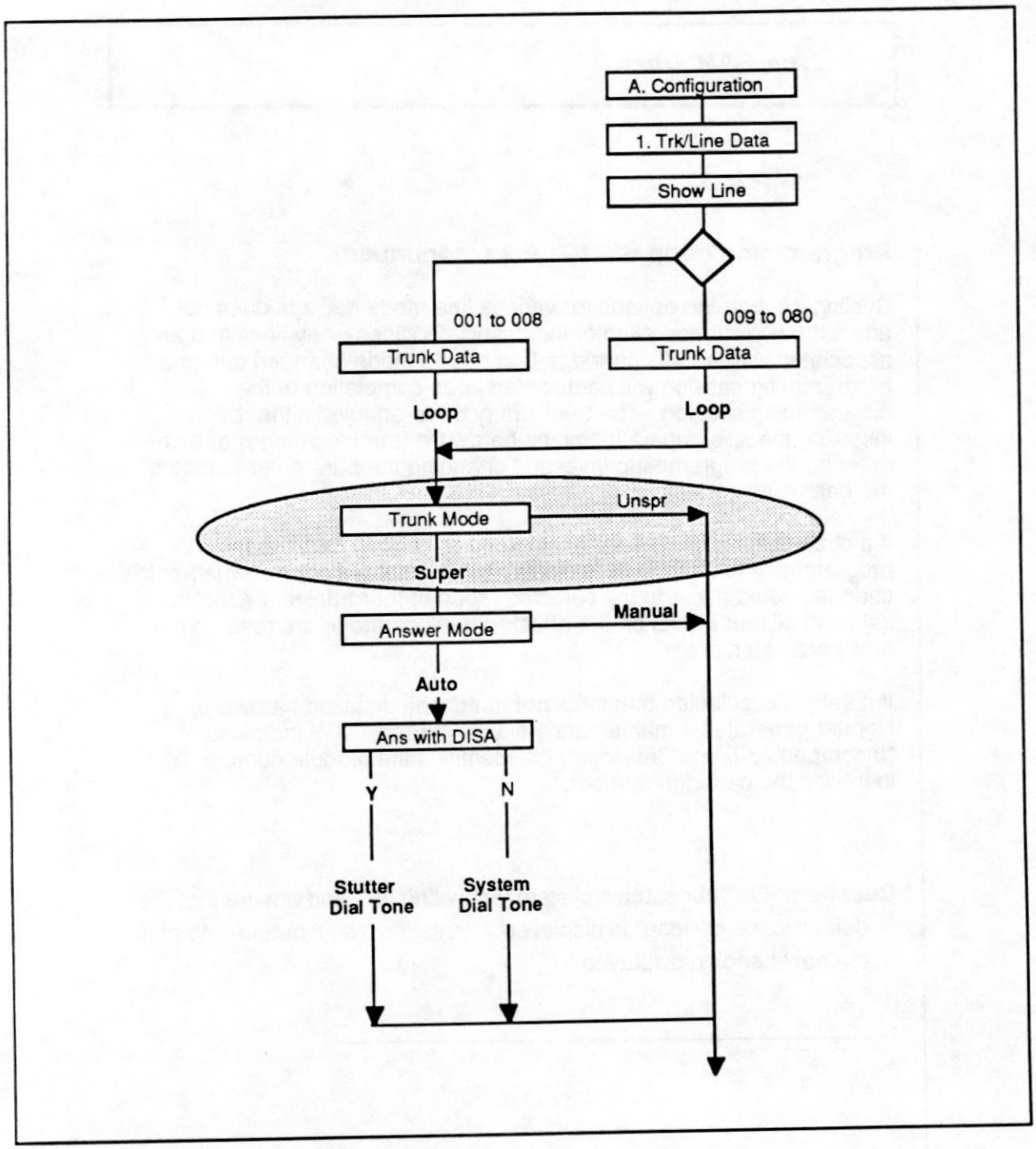
If a change is requested, for example from Loop to E&M, the programming telephone set's display will prompt (yes or no) whether the change should occur to the selected group of four trunks. If 'Yes' is selected all four trunks on the affected trunk cartridge are reset to the new parameter.

If a setting is selected that does not match the installed hardware, Norstar generates a maintenance alarm; Alarm:61-X-Y indicates "Incompatible Trunk Cartridge". 'X' identifies the module number; 'Y' identifies the cartridge number.

Question: On your captive system, show line 009 and ensure that the default value of "loop" is displayed. Press the 'Next' button. What is the next heading displayed?

_____

LOOP START TRUNK PROGRAMMING



Answer:

Trunk Mode:Super

Programming Loop Start Trunks (continued)

The programming chart on the facing page shows the options available for loop start trunk programming under the heading "Trunk Data". Default values are shown in bold type.

The "Trunk Mode" sub-heading offers two settings: Super and Unspr. This feature functions the same as previous DR3 software.

Loop start trunks programmed as "Unspr" cannot be programmed to automatically answer calls.

The "Super" setting is required for loop start trunks to operate in the Auto-Answer mode. Auto-Answer may be used to provide remote access to the Norstar System.

"Super" is also the required setting for two other features of DR4 software: Selective Line Redirection and Unsupervised Conference. These features will be explained in detail in the Feature Operation section of the course.

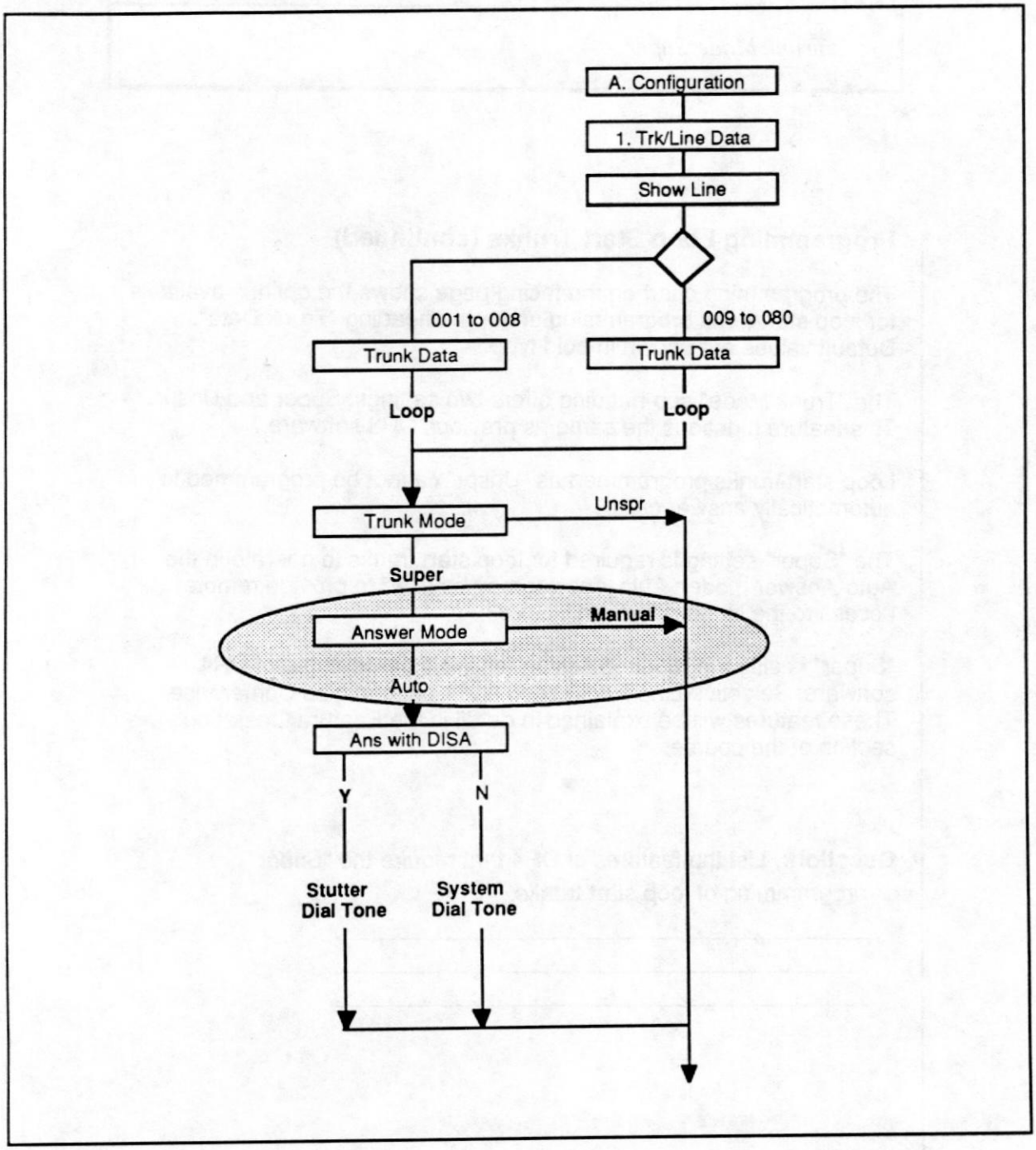
Question: List the features of DR4 that require the "Super" programming of loop start trunks.

_____

_____

_____

LOOP START TRUNK PROGRAMMING



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UNIT 2: HARDWARE COMPONENTS

UNIT 3a: CONFIGURATION PROGRAMMING

UNIT 3b: ADMINISTRATION PROGRAMMING

UNIT 4: FEATURE OPERATION

UNIT 5: TROUBLESHOOTING

APPENDIX

INTRODUCTION

About The Course

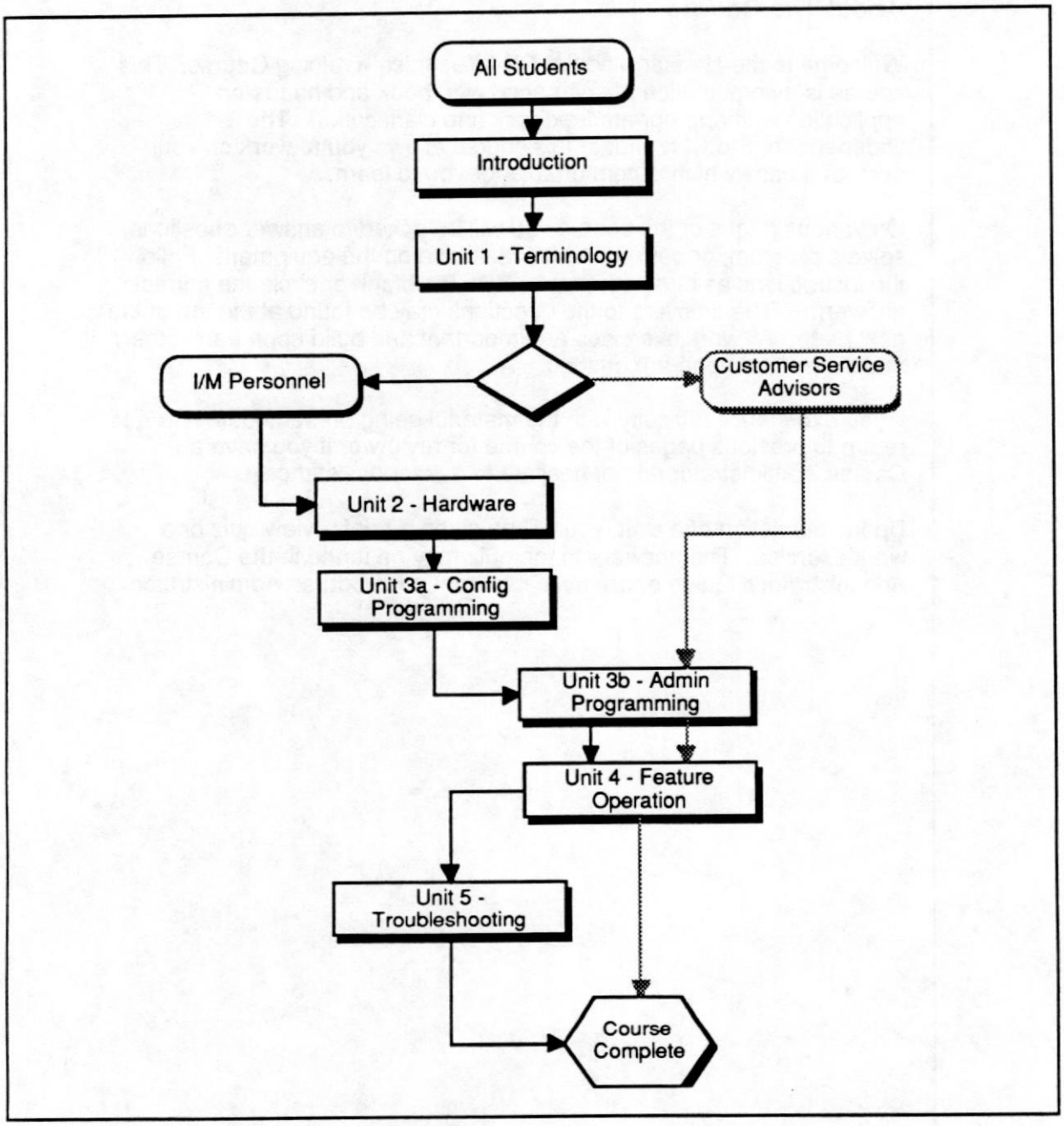
Welcome to the Norstar Modular DR4 Technical Training Course. This course is a combination of self-paced workbook and hands-on application with appropriate feedback and clarification. The 'Independent Study' format of this course allows you to work on your own, at a pace which is comfortable for you to learn.

On various pages of the course you will be asked to answer questions, solve a problem, or perform a work exercise on the equipment. Follow the instructions as directed; that is, fill in the blank or circle the correct answer(s). The answers to the questions may be found at the top of the next page. All work exercises are important and build upon each other; make sure that none are omitted.

If you experience difficulty with the material being presented, feel free to return to previous pages of the course for review or if you have a Course Administrator do not hesitate to ask for assistance.

Upon completion of a Unit, you will be given a brief review quiz or a work exercise. The answers to the quiz may be found in the Course Administrator's Guide or are available from your Course Administrator.

Course Map


All Students
Introduction
Unit 1 - Terminology
I/M Personnel
Customer Service Advisors
Unit 2 - Hardware
Unit 3a - Config Programming
Unit 3b - Admin Programming
Unit 4 - Feature Operation
Unit 5 - Troubleshooting
Course Complete

About The Students

The course has been designed for both experienced Electronic Key Telephone System installation and maintenance personnel and experienced Customer Service Advisors. The Course Map on the facing page depicts the route you should proceed through depending on your job function.

As an Installation/Maintenance (I/M) person, you can expect to spend approximately 8 hours to complete this course. As a Customer Service Advisor (CSA), you can expect to spend approximately 4 hours to complete the course. The actual time taken will vary depending on your previous field experience and your knowledge of Norstar Modular.

As the Norstar Modular DR4 product is an enhancement to the Norstar Modular product line, the "Norstar Modular DR3 Installation Course" is a prerequisite, for Installation and Maintenance personnel. The Norstar Modular DR3 Programming and Feature Operation Course is the required prerequisite for Customer Service Advisors.

To obtain full value from the DR4 Technical Training course, the required prerequisite course **must** be successfully completed before commencing this course.

Course Intent

This course is intended to build upon the knowledge which you gained from the "Norstar Modular Installation Course" and your previous field experience. The "Norstar Modular Course" was developed around the DR2 software feature cartridge. The Norstar Modular DR4 Installation Course which you are now reading will explain the DR4 software functions associated with the Norstar Modular KSU.

Upon completion of this course an I/M person will be able to:

- Upgrade a Norstar Modular System from DR2 to DR4 software.
- Upgrade a Norstar Modular System from DR3 to DR4 software.
- Program the parameters specific to Modular DR4 software into the Configuration Level of programming.
- Program DR4 software parameters related to the Administration Level of programming.
- Operate Modular DR4 telephone set features from a variety of Norstar Telephone sets.
- Use the Maintenance Session capabilities of DR4 to troubleshoot common problems

Upon completion of this course a CSA will be able to:

- Program DR4 software parameters related to the Administration Level of programming.
- Operate Modular DR4 telephone set features from a variety of Norstar Telephone sets.

Required Materials

To complete this course, you will need:

1. A Norstar Modular KSU - M8X24-DS.
2. A DR4 Feature Cartridge
3. A two-port Expansion Cartridge.
4. A Trunk Module
5. Norstar Trunk Cartridges as listed below:
   - DID
   - E&M/DISA
6. Central Office trunks as listed below:
   - Four Loop Start trunks
   - One DID trunk with 4 DID numbers.
7. Four Norstar Telephones as listed below:
   2 - M7208
   1 - M7310
   1 - M7324
8. One single line telephone set (tone)
9. Pen or Pencil
10. This Course Workbook
11. DR4 Installer Guide or System Coordinator Guide

Complete installation and set-up instructions for the required training aids are provided for the Course Administrator in the Appendix (Course Administrator Guide)

IMPORTANT:

1. A DS KSU (Disconnect Supervision) **must** be used to complete this course. If a DS KSU is not available, the work exercises within the Feature Operation Unit of the course will not function.

2. An E&M/DISA trunk cartridge is required to supply DTMF receiver for auto-answer loop start trunks connected to the KSU. If an E&M/DISA trunk cartridge is not available, the work exercises within the Feature Operation Unit of the course will not function.

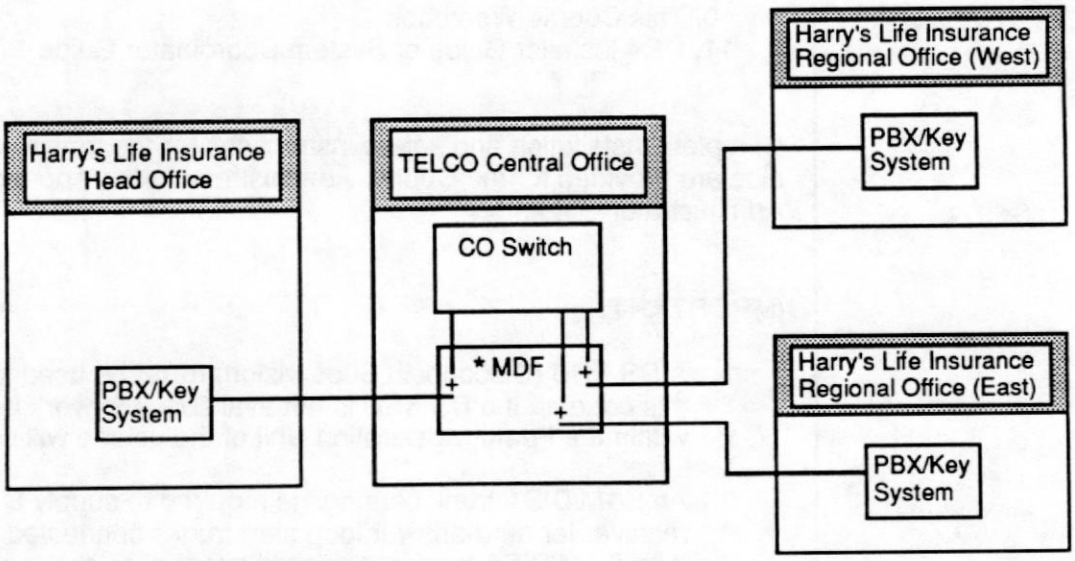
About Norstar Modular DR4

Norstar Modular DR4 is a software enhancement to the Norstar Modular Business Communications System. DR4's primary function is to allow networking of telecommunications, bringing the Modular System into the realm of PBX (Private Branch Exchange) telephone systems.

Telecommunications networking can be defined as a group of switching systems linked together to permit end-to-end communications. Norstar Modular DR4, for the purposes of this course, can be considered as one such switching system.

In the past, most telecommunications networking was provided through the use of the Telco's switching equipment in the Central Office thus using the Telco's Public Network. As businesses grew and expanded to various locations (example: Head Office / Regional Offices) so did their need for increased communications.

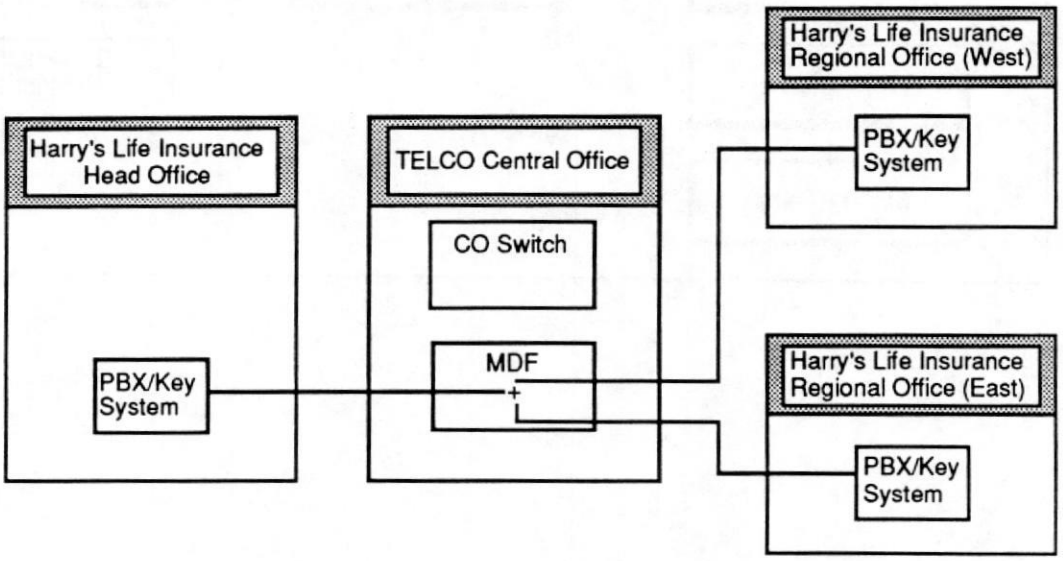
Public Network



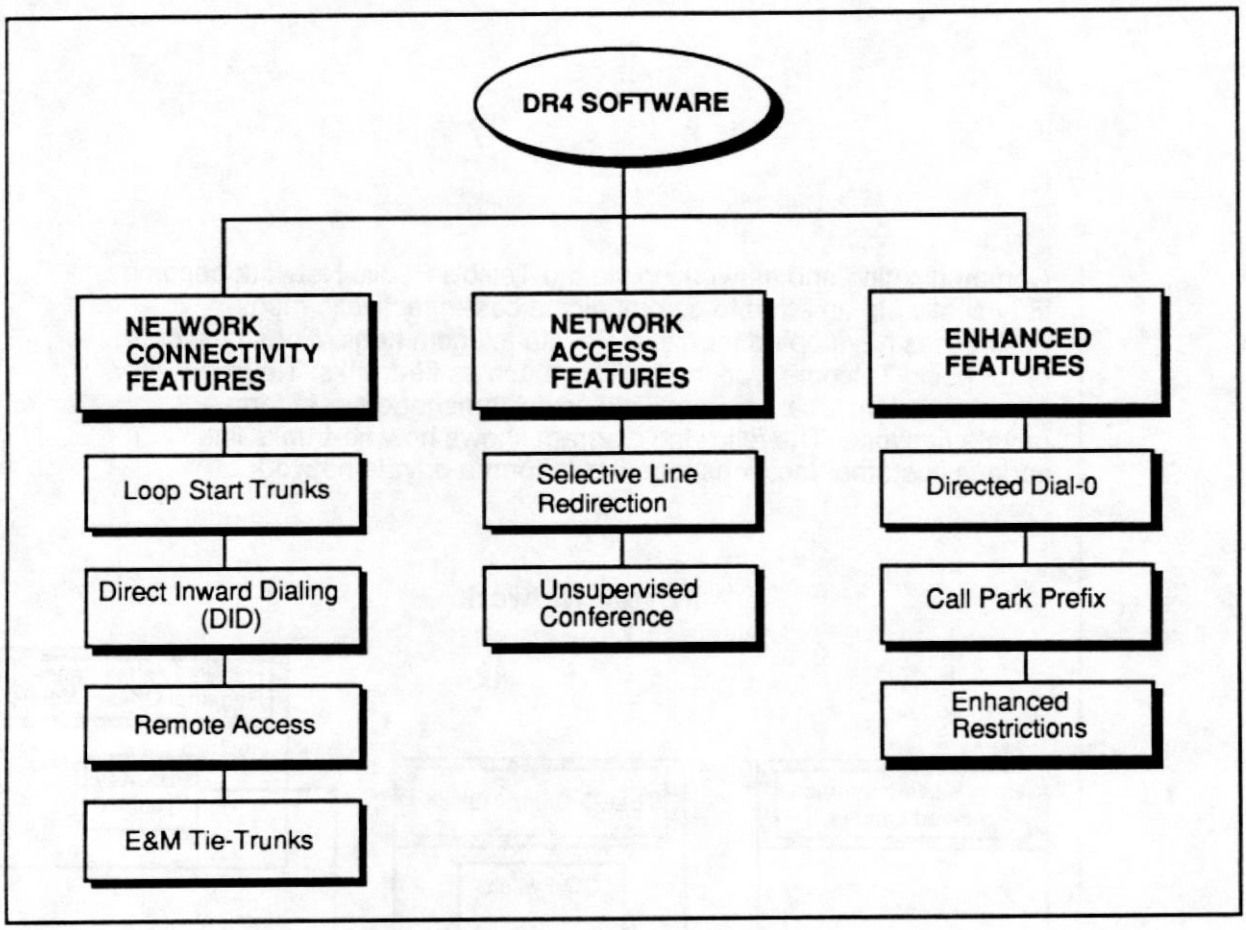
* "MDF" refers to the Main Distribution Frame within the Telco's Central Office. The MDF cross-connects Central Office switch circuits to physical cable pairs.

Communicating and networking via the Telco's Public Network becomes very costly. In an effort to communicate cost-effectively, many businesses have opted for either Private telecommunications networks or for using Telco networking facilities such as tie-trunks. Tie-trunks link all independent local communications systems together to form a private network. The following diagram shows how tie-trunks link various customer locations together to form a private network.

Private Network



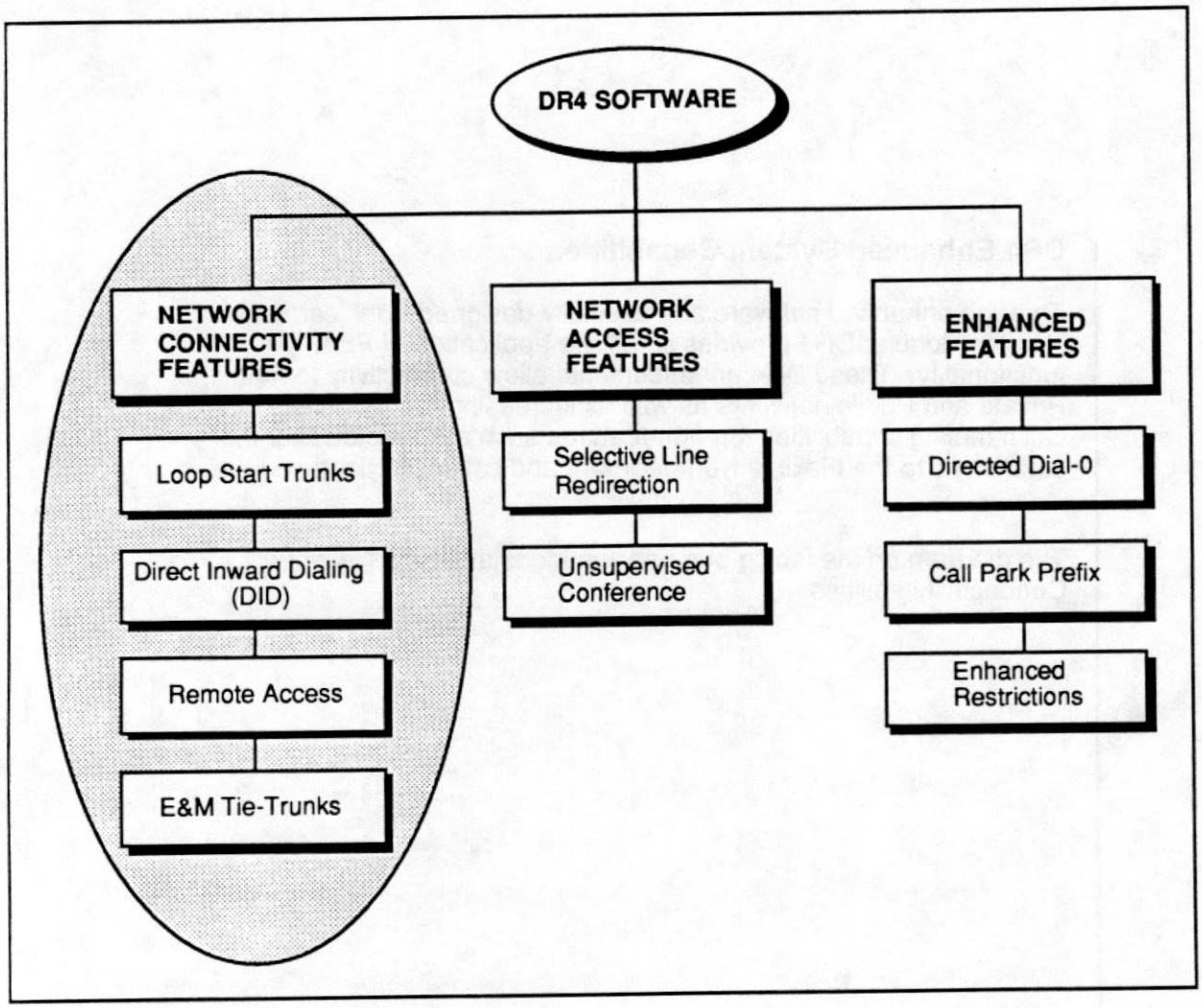
As indicated in the previous diagrams, the main difference between a Public Network and a Private Network is that the sites in a Private Network are connected together independent of the Central Office switch.


DR4 SOFTWARE
NETWORK CONNECTIVITY FEATURES
NETWORK ACCESS FEATURES
ENHANCED FEATURES
Loop Start Trunks
Direct Inward Dialing (DID)
Remote Access
E&M Tie-Trunks
Selective Line Redirection
Unsupervised Conference
Directed Dial-0
Call Park Prefix
Enhanced Restrictions

DR4 Enhanced System Capabilities

Through enhanced software and specially designed trunk cartridges Norstar Modular DR4 provides small line application of PBX functionality. These DR4 enhancements allow connectivity to both Private and Public networks as well as increasing the Modular's internal call handling capabilities through features such as Directed Dial-0, extensions to the Flexible Number Plan, and call restrictions.

The diagram on the facing page shows Modular DR4's Network Connectivity abilities.


DR4 SOFTWARE
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NETWORK ACCESS FEATURES
Selective Line Redirection
Unsupervised Conference
ENHANCED FEATURES
Directed Dial-0
Call Park Prefix
Enhanced Restrictions

Network Connectivity Features

The Network Connectivity features are shown in the shaded area of the diagram on the facing page.

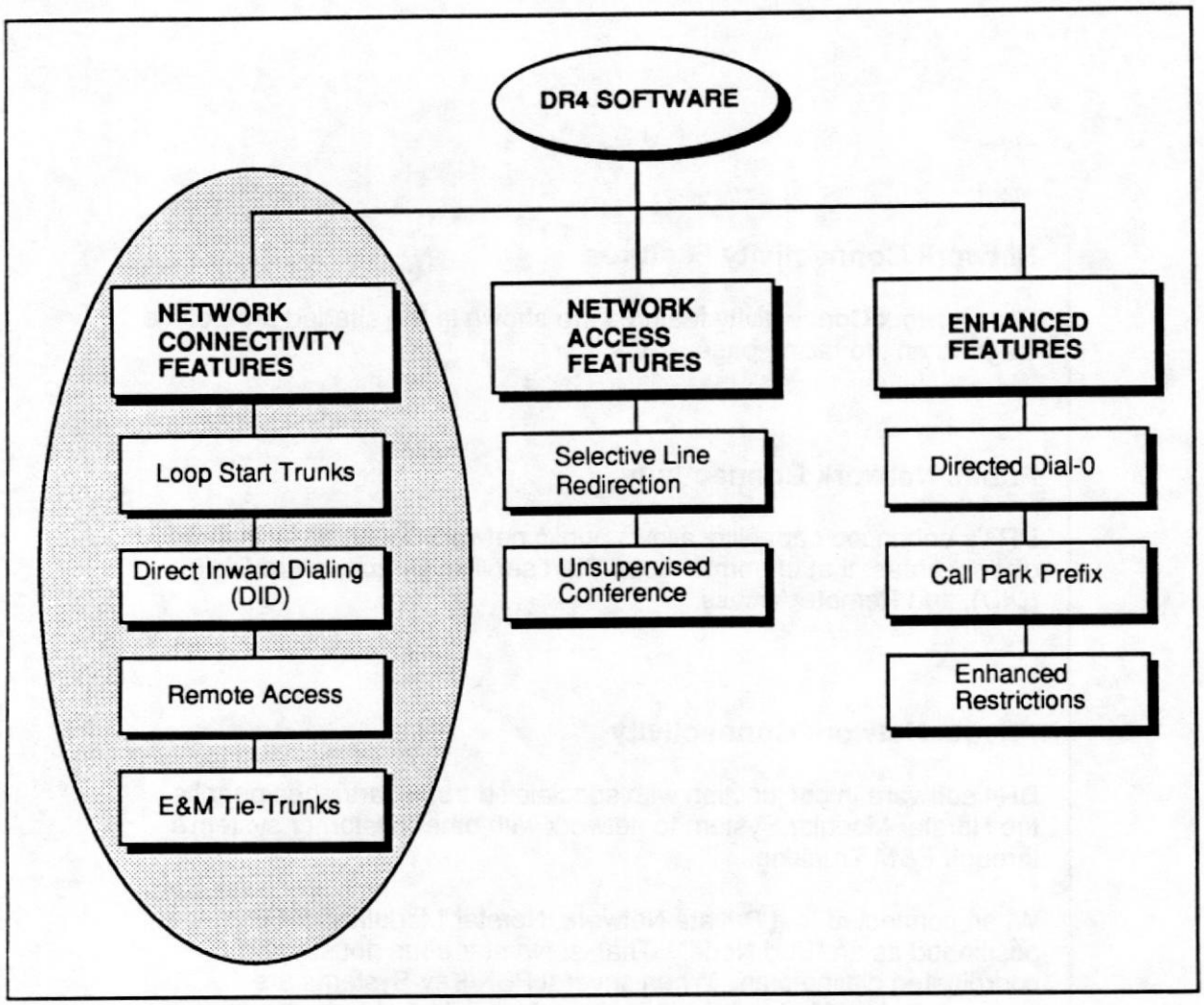
Public Network Connectivity

DR4's enhanced capability allows public network connectivity in three distinct areas; that of normal Loop Start service, Direct Inward Dialing (DID), and Remote Access.

Private Network Connectivity

DR4 software in conjunction with specialized trunk cartridges permits the Norstar Modular System to network with other customer system's through E&M Trunking.

When connected to a Private Network, Norstar Modular DR4 is positioned as an "End Node". That is, Norstar does not support a coordinated dialing plan. When several PBX/Key Systems are connected via E&M trunking, a coordinated dialing plan may be used to enable a customer to place a call to a station of another switch by dialing a unique 3 to 7 digit number. No access codes or pauses to wait for dial tone are required. To place a call to another switch with Norstar, E&M trunks must be accessed either manually (pressing line buttons) or accessed through a line pool (access codes).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Loop Start Service

As with Norstar Modular DR2 and DR3, modular DR4 offers the same type of connectivity. Loop Start trunks allow both incoming and outgoing calls between Norstar and the Telco's Public Network.

Direct Inward Dialing (DID)

Incoming calls to a PBX/Key Telephone System are generally answered by an attendant. After the attendant determines whom the call is for, the attendant transfers the call.

DID trunking is a service provided by Telcos which allows an incoming call to reach a specific called number within a PBX/Key system without attendant assistance.

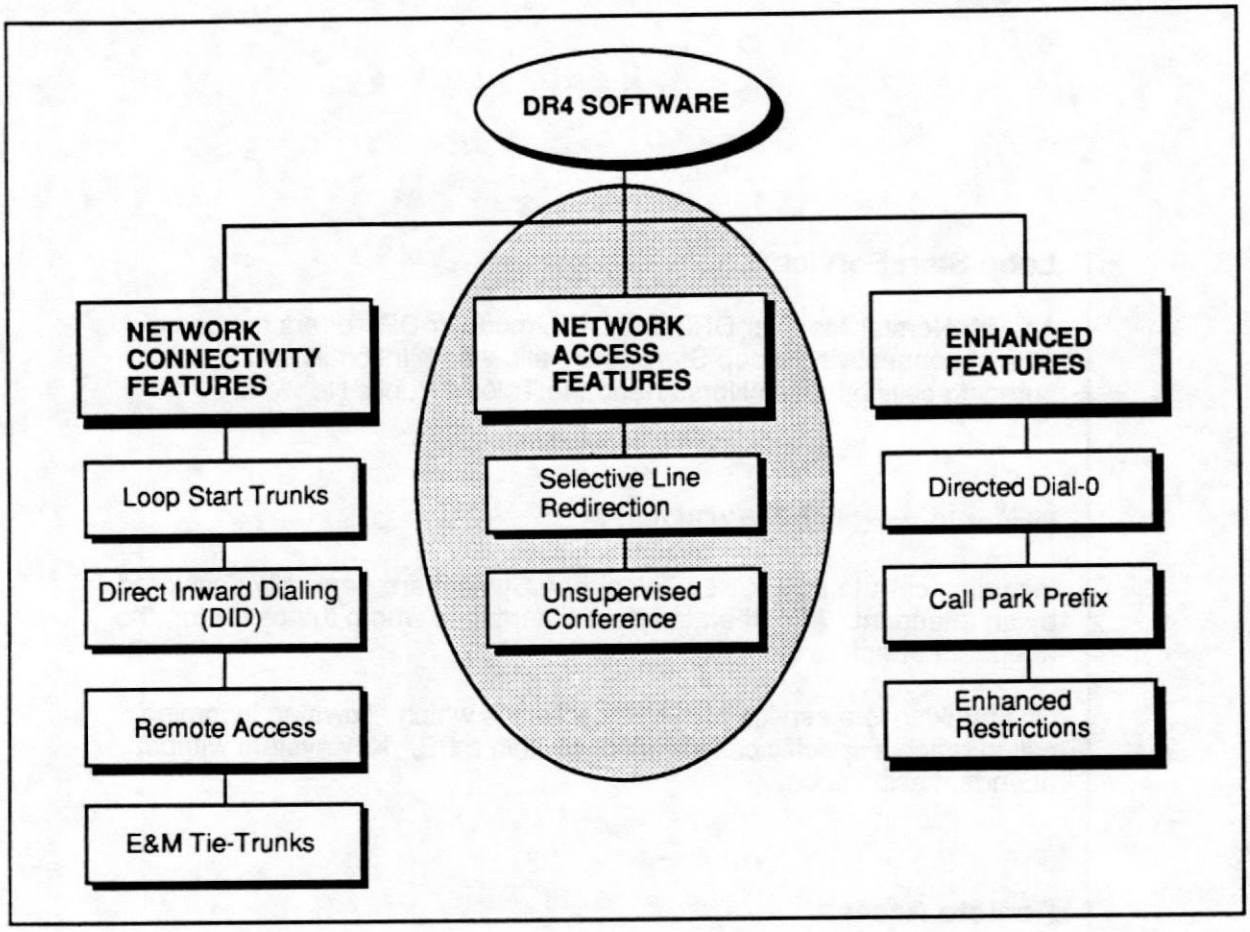
Remote Access

Remote Access is a facility which provides an outside caller with the ability to dial directly into a PBX/Key system without attendant intervention. Once access has been gained to the system, the caller may use the system facilities to place outgoing calls or access system features.

E&M Trunks

E&M trunks provide a direct circuit (referred to as a tie-trunk) between two customer sites using industry standard Type II interfacing (E&M interfacing will be presented in detail later in the course).

E&M trunks allow direct communications between users on a private network at a reduced cost. Companies are typically charged a flat rate as opposed to a per call usage charge.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Network Access Features

As well as enhancing some of the Norstar's existing features, DR4 software increases the flexibility of networking with features such as Selective Line Redirection and Unsupervised Conference.

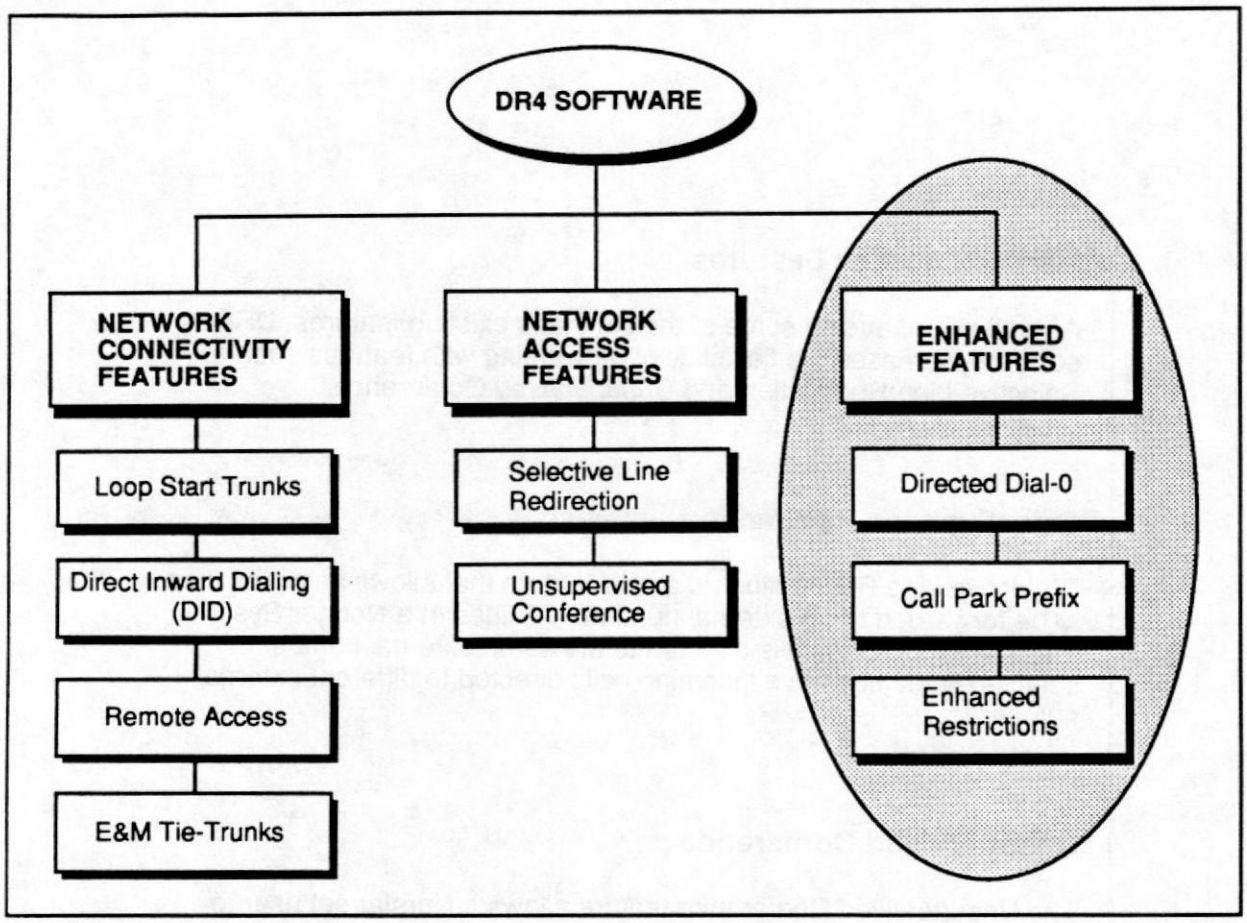
Selective Line Redirection

"Selective Line Redirection" is a new feature that allows selected lines to be forwarded to an external number. All lines of a Norstar System may have incoming calls directed to the same external number or selected lines may have incoming calls directed to different external numbers.

Unsupervised Conference

The Unsupervised Conference feature allows a Norstar set user to answer an incoming call and transfer the call to an outgoing line. After all three parties have been connected the Norstar set user may then exit the call leaving the two outside parties connected.

When using this feature, one of the calls must be an incoming call to the Norstar System.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Enhanced Restrictions

Enhanced Features

Some features of previous Norstar Modular software versions have been improved to allow greater flexibility.

Directed Dial '0'

The Direct Dial '0' feature is an enhancement to the same feature of DR3 software. With DR3, this feature allowed Norstar sets to call to a central location by dialing a single digit on the intercom. The enhancement allows different Norstar sets to call to different central locations by dialing the same digit on the Intercom. An additional programming parameter of 'None' may be used to disable the feature and thus increase the number of digits available for numbering plan use.

Call Park Prefix

The Call Park Prefix feature has been enhanced to allow more flexibility with DR4's numbering plan. An additional programming parameter of 'None' may be used to disable the feature and thus increase the number of digits available for numbering plan use.

Enhanced Restrictions

The Restrictions and Overrides feature associated with previous versions of Norstar Modular software have been enhanced to provide for greater flexibility when setting up tables of call restrictions.

Dialing filters now replace restrictions and overrides to not only specify how outgoing calls are treated but also to specify the capabilities associated with incoming remote access calls. They can be assigned in various areas of programing to provide levels of service and also to restrict levels of service.

NOTES

UNIT 1 - INTRODUCTION TO DR4 TERMINOLOGY

Before we begin an indepth look at Norstar Modular DR4, we will start with explanations pertaining to common telephony terminology and acronyms. Some of these terms may or may not be familiar to you and may differ from definitions that you may be used to. It is a good idea for you to read through the material not only to refresh your memory but to gain a good concept of how these terms and features have been defined specific to DR4 functions.

As you read through this unit of the course you will be exposed to the following features and terms:

- Trunk
- Line
- Auto-Answer
- Target Line
- Target Line Mapping
- DID
- E&M
- Remote Access
- DISA

Each of the features and terms will be identified and explained in detail as you progress through the Unit. Indepth explanations and practical examples will assist you in becoming proficient with these concepts. Upon completion of this unit you will be able to answer mix and match type questions pertaining to these terms.

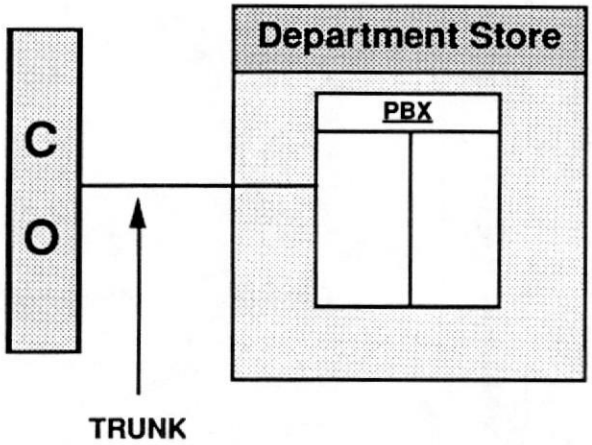
Please turn the page and begin reading about the first term. Remember to answer the questions as you proceed.

NOTES

Trunk

A trunk as defined by the telecommunications industry is a physical connection between switches in a network. Whether connecting a Telco Central Office switch to a customer PBX/Key System or connecting two customer PBX/Key Systems (switches) together the term trunk represents the physical connection.

A typical example of a trunk is a directory number from a Telco Central Office connected to a PBX/Key System of a department store.



Question: Answer the following statement as either True or False. Write your answer in the space provided.

Central Office (CO) Lines connected to a Norstar System are considered to be trunks.

_____

NOTES

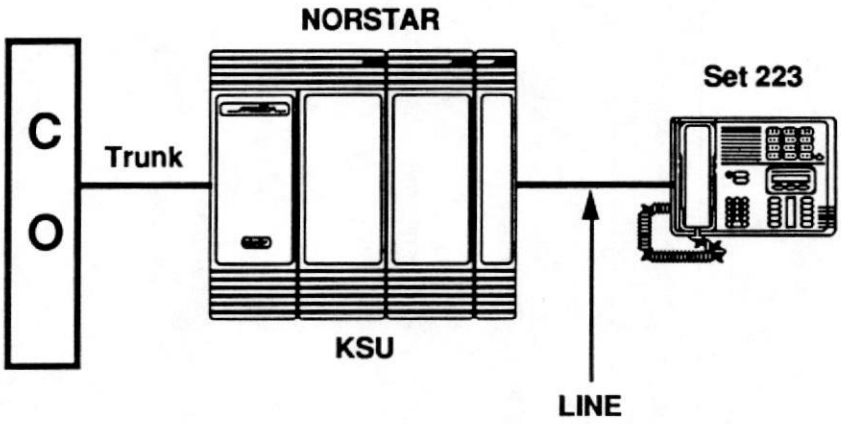
Answer:

True

Line

A line is considered to be the physical connection between a switch and a device. The device could be anything normally connected to a telephone circuit such as a telephone, a modem, or a FAX machine.

A typical example of a line is the connection of a telephone set to a PBX/Key System within an office building.



Question: Explain the difference between a trunk and a line.

NOTES

Answer:

> *A trunk is the physical connection between two or more switches A line is the physical connection between a switch and a device.*

Auto-Answer

Norstar DR4 supports a new feature called "Auto-Answer" which may be programmed to individual trunks of a Norstar System. A call coming into the Norstar System on a trunk programmed for Auto-Answer will be automatically answered by the KSU.

Dependent on trunk programming, the incoming caller may be presented with either system dial tone or special (stuttered) dial tone.

If the caller receives system dial tone, the caller is required to enter a series of digits which match pre-programmed digits strings.

If the caller receives stuttered dial tone, the caller may then enter a password followed by a series of digits which match pre-programmed digits strings. The password preserves system security thus avoiding system access by unauthorized callers.

The series of digits entered may access a Target Line, Remote Page, or a Line Pool.

Digit strings are configured to a new DR4 feature called "Target Lines". Target Lines are then assigned to the line buttons of desired Norstar sets. (The Target Line feature will be explained in detail, on the next few pages of the course.)

Later in the course you will be exposed to the Auto-Answer feature in relation to Loop Start and E&M trunks.

Question: Answer the following statement as either True or False.

Incoming calls on trunks programmed for Auto-Answer are presented with dial tone. Incoming callers must then dial a series of digits to access Norstar sets.

_____

NOTES

Answer:

True

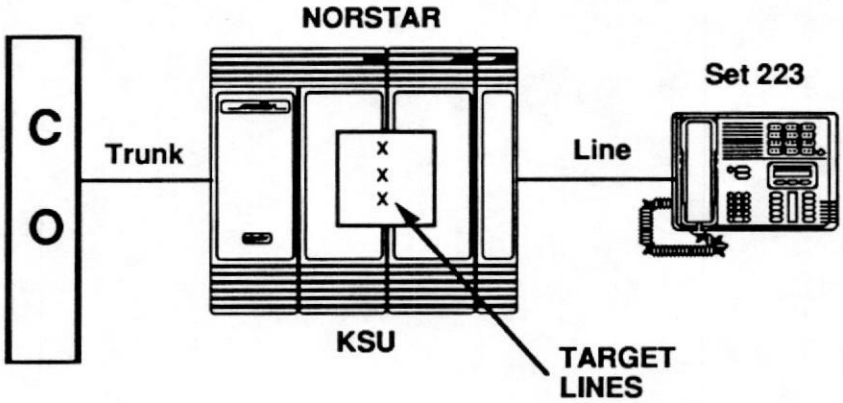
Target Lines

Target Line is a new term introduced in Modular DR4 to define the internal software and hardware connection within the Norstar KSU which links a trunk to a line. Target Lines allow concentration of incoming calls on fewer trunks than is normally associated with a one trunk to one line system configuration ratio.

A Target Line is a specific communications path reached by means of digits received from an incoming trunk.

Target Lines are used to answer incoming calls but cannot be used to place outgoing calls.

The following diagram depicts an example of a Norstar Target Line.



Question: Fill in the blanks.

Target lines are internal to the Norstar System which provide a link between: _____ and _____.

NOTES

Answer:

Trunks and Lines.

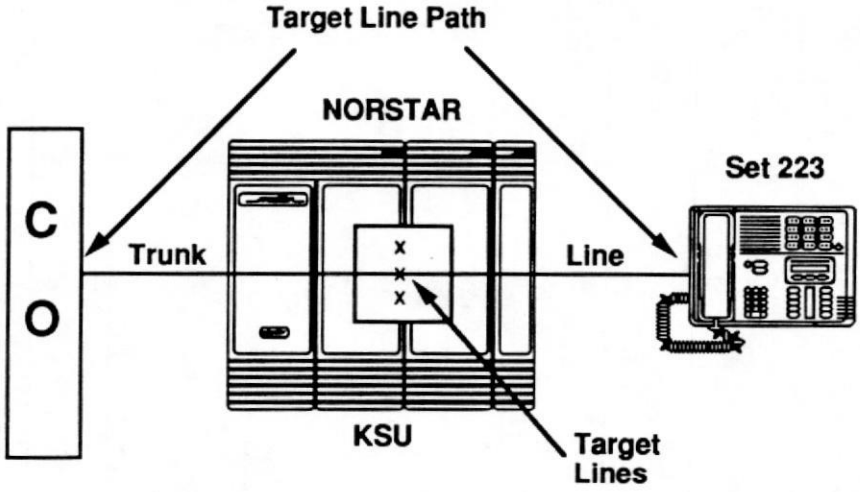
Target Lines (continued)

A Target Line is programmed with digits that it expects to receive on an incoming call. Various target lines are programmed to receive a different and specific set of digits called a digit string. Automatically answered calls are routed to different and specific destinations depending on the digits received and the assignment of the target lines to the Norstar sets.

The communications path that the digits take as the call proceeds from the Central Office to the Norstar set is made up of three components:

1. **Line** - Physical connection between the Norstar set and the Norstar KSU.
2. **Trunk** - Physical connection between the Norstar KSU and the switching machine.
3. **Target Line** - Internal Norstar software and hardware link which matches the dialed digits to the digit string.

The following diagram shows a complete communication path from the Telco Central Office to the Norstar set.



Question: List the three components of a communications path with Norstar

_____

_____

_____

NOTES

Answer:

Trunk
Line
Target Line

Target Lines (continued)

A one-to-many relationship (concentration) between trunks and lines may be achieved through the use of Norstar's Target Lines. Target Lines are not physical connections but are provisioned through Norstar software programming.

Previous versions of Modular software only permitted the physically connected trunk to be programmed with various parameters and then directly assigned to desired Norstar sets. Modular DR4 allows trunks to be programmed the same as before; however, the trunks may or may not be assigned directly to the Norstar telephone set.

The target line feature may be used to concentrate incoming calls on a few trunks to many sets, or trunks may be assigned to Norstar sets as a one-to-one relationship between a trunk and a line without using the target line feature

Question: List the two relationships between trunks and lines that Modular DR4 is able to support.

_____

_____

_____

NOTES

Answer:

1. One line to one trunk assigned as previous Modular software.
2. Many target lines to one incoming trunk (concentration).

Target Lines (continued)

Target Lines increase the system's flexibility and capacity. In addition to the maximum number of 80 trunks, DR4 provisions for 104 Target Lines.

Target Lines do not use port allocations and therefore the maximum Modular System capacity of 128 ports remains unchanged.

The maximum number of 104 target lines assumes a fully hardware provisioned system. The actual number of target lines allowed varies with the type of Expansion Cartridge installed.

Page two of the "Configuration section" of the Installer Guide shows that a non-expanded system (KSU only) does not support target lines.

Question: Refer to the Installer Guide and enter the required information.

a. When a 2-port Expansion Cartridge is installed, a maximum of _____ target lines are supported.

b. A _____ Expansion Cartridge is required to support all 104 target lines.

NOTES

Answer:

a. 40
b. 6-port

Target Line Mapping

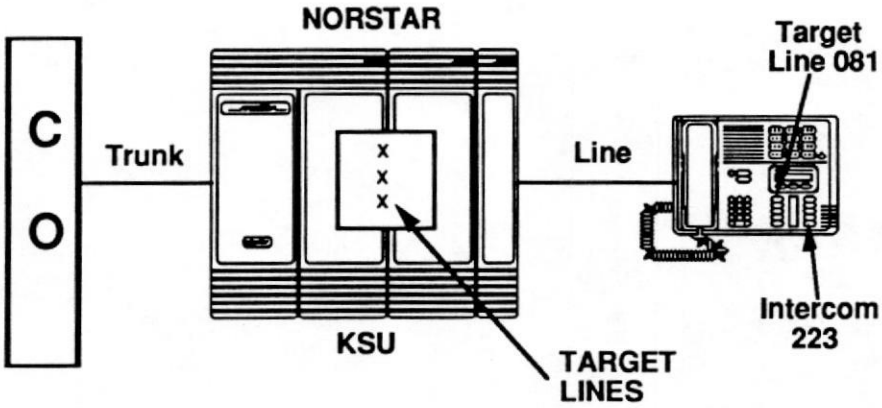
As mentioned earlier in the course, Target Lines are used to answer incoming calls but cannot be used to place outgoing calls.

The digits received on an incoming trunk may be received from a Central Office, received from another PBX/Key system, or dialed by a remote user after having gained access to the Norstar system.

Each Target Line is programmed with digits that it expects to receive.

Norstar software monitors for received (incoming) digits on the trunk and then matches the digits to the digits programmed to a Target Line. Once a match is made, the incoming call is processed and mapped to the Norstar set(s) or device with that specific Target Line assignment.

Incoming calls to a target line appear at the Norstar set as Line Appearances. Only intercom calls or calls transferred to a set without the line appearance will appear on the intercom button of a Norstar set.



Question: Answer the following as either True or False.

a. Target lines may be used to place outgoing calls.

_____

b. Calls to target lines appear on the Norstar set's Intercom button.

_____

NOTES

Answer:

a. False
b. False

Target Line Programming

Programming a Target Line path is a four step process.

Step 1 - Programming a Trunk

Trunks are programmed in Configuration Programming under the sub-heading of "1.Trk/Line Data" as line numbers 001 to 080. In this part of programming, parameters specific to each incoming trunk are assigned.

Step 2 - Assigning Length of Received Number

The number of digits that make up a digit string is specified in the Configuration level, "5.System data", Rec'd # length". This programming allows the length of the target line digit string to be adjusted to match numbering plan requirements.

Step 3 - Programming a Target Line

Target Lines are programmed in Configuration Programming under the sub-heading of "1.Trk/Line data" as line numbers 081 to 184. In this area of programming the digits which the Target Line expects to receive are assigned.

Step 4 - Programming Target Line Appearances

After the trunk has been programmed with its associated parameters (Step 1), and after the Target Line has been programmed with the received digits (Step 2), and after the received digits have been assigned to the Target Line (Step 3), the final step in the process is to assign the Target Line to the desired Norstar answering set(s). Target Lines are assigned as line appearances in Configuration Programming under the sub-heading "2.Line Access" in the same manner that lines are assigned in Modular DR2 and DR3 programming.

Question: When programming Target Lines, what step should be completed before digits are assigned to the target lines?

_____

NOTES

Answer:

The length of the target line received digits should be specified.

Target Line Mapping

To better understand the concept of Norstar Target Line Mapping, read through the following example and refer to the diagram on the following page.

For instructional purposes, the example used is purely fictional and may not match an actual application. Additional programming requirements will be explained later in the course.

- Trunk 001, a Loop Start trunk, has been programmed to automatically answer incoming calls.

- Three Target Lines have been programmed to receive the digits as shown on the following chart:

Target Line	Received Digits
081	110
082	111
083	112

- The Norstar Sets have been assigned with Target Line appearances as shown below:

Target Line	Set's Internal Number
081	222
082	223
083	224

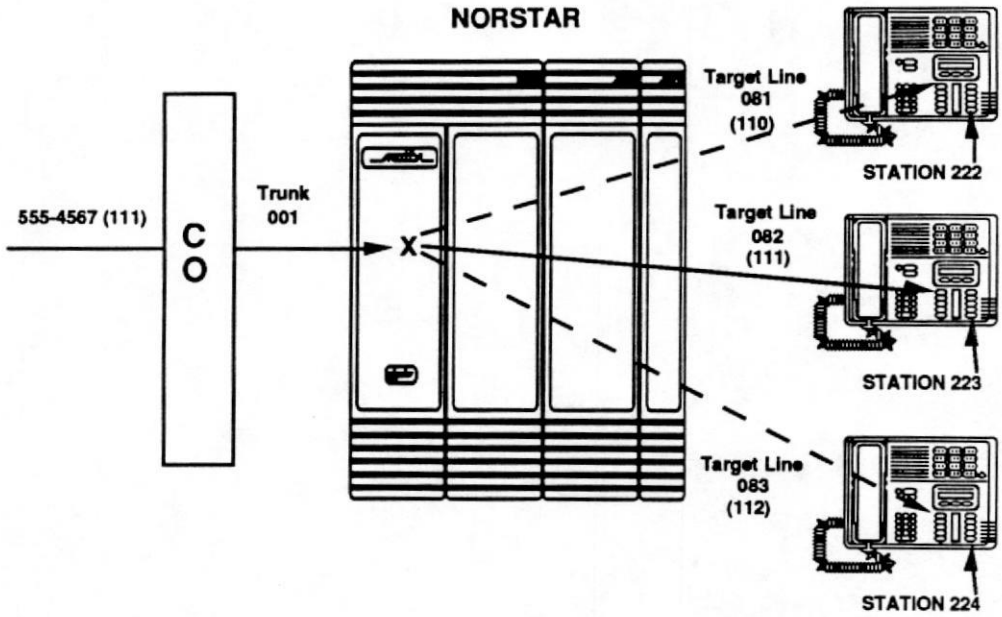
- Assume that the CO number for the Norstar System is 555-4567.

NOTES

Target Line Mapping (continued)

An external caller dials the digits 555-4567 and seizes trunk 001 of the Norstar. After the call is automatically answered, Norstar returns system dial tone to the caller in preparation to monitor incoming digits.

The caller then dials the digits 111. Norstar interprets the digits and matches them to Target Line 082. After the match has been made Norstar maps (routes) the incoming call to the Norstar set with the internal number 223, as shown in the diagram below.



Question: Fill in the blanks.

From this example, an incoming call on trunk 001 to CO number 555-4567 followed by the digits 110 would be mapped on Target Line _____ to the set with intercom number _____ .

NOTES

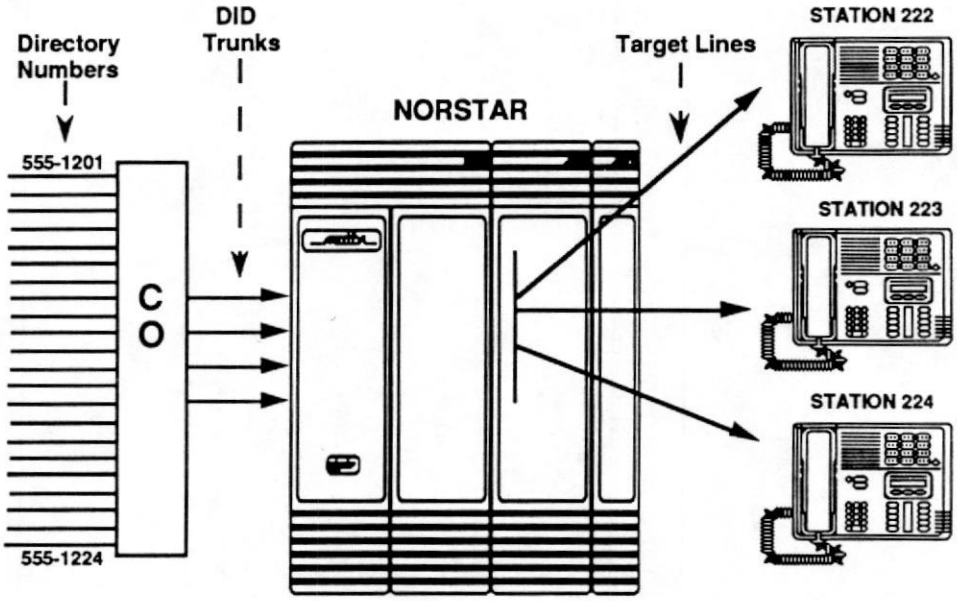
Answer:

> *Target Line* ***081*** *to the set with intercom number* ***222*** *.*

Direct Inward Dialing (DID)

Direct Inward Dialing allows incoming calls from the public network to have direct access to Norstar sets, via Target Lines, without the assistance of an attendant. DID trunks are incoming only and concentrate a one-to-many trunk per line ratio. The suggested concentration ratio is one DID trunk for every six DID numbers (target lines).

For example, a customer can reserve a bank of 24 directory numbers from the Central office. Using the suggested 1 to 6 trunking ratio the directory numbers 555-1201 to 555-1224 would all come into the Norstar System on 4 DID Trunks.



Received Number	Target Line
1201	081
1202	082
↓	↓
1223	103
1224	104

NOTES

Direct Inward Dialing (continued)

When an external caller dials the DID number, the Telco Central Office sends the desired number to the Norstar KSU on a free DID trunk. Norstar interprets the incoming digits and maps the digits onto the corresponding received number of Norstar programming. Norstar then routes the call to the Norstar set(s) which has been assigned the matching Target Line.

DID trunks can be much less expensive than Centrex service by concentrating a few DID trunks into the PBX/Key System to be shared by many sets. Centrex service, on the other hand, requires wiring each set to a port of the Centrex System thereby increasing the need for individual station wiring to the host Centrex System.

Question: Answer the following as either True or False.

Outgoing calls may be placed on a DID trunk to the public network.

_____

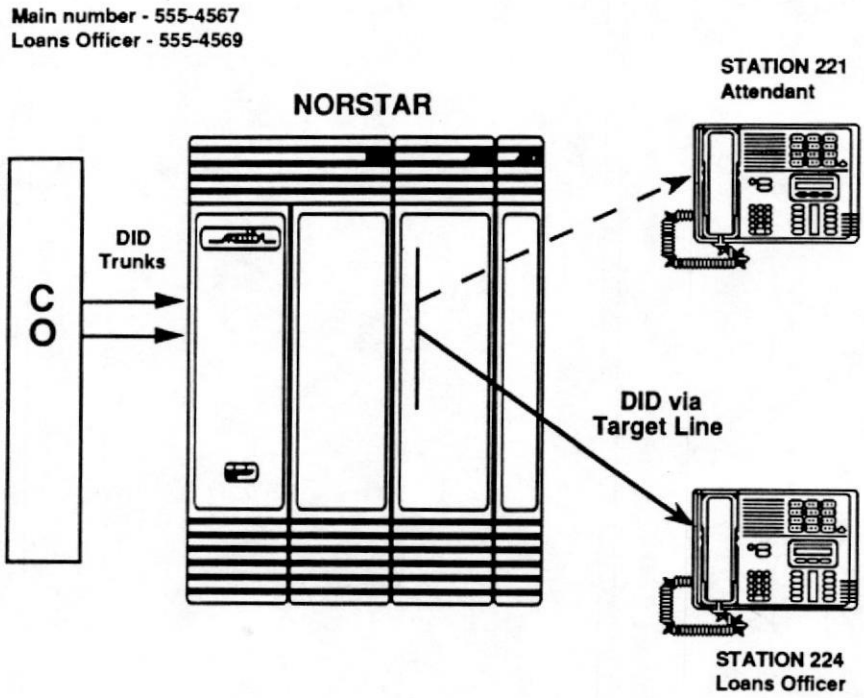
NOTES

Answer:

False

Direct Inward Dialing (continued)

A practical example of a DID call would be a caller requiring the assistance of a loans officer of a bank. Instead of calling the bank's main number as listed in the Telephone Directory, the caller can dial directly to the loans officer's target line thus bypassing the attendant.



The incoming call arrives at the loans officer's set on the line button associated with the target line, not on the set's intercom button.

Question: Answer the following statement as either True or False.

DID calls are routed directly to the called target line number bypassing the system's attendant.

_____

NOTES

Answer:

True

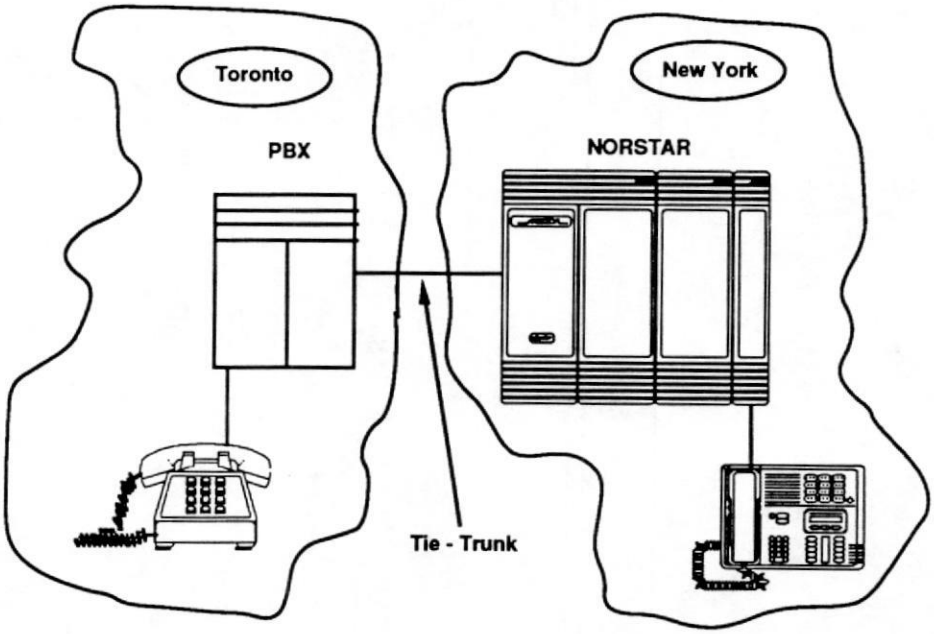
E&M Tie-Trunks

E&M Trunks are commonly referred to as "Tie-Trunks" because they "Tie" or link two or more PBX/Key Systems together. Tie-Trunks are the arteries of a private network. When Norstar Modular is part of a private network tie-trunks handle the incoming and outgoing calls between the Norstar System and other switches in the private network.

Tie-Trunks are used by customers to reduce communications costs normally associated with toll (long-distance) calls to regional locations of the same business. The customer is charged the same rate regardless of the use of the trunk.

Normally, the set user at one end will dial an access code to seize the tie-trunk; dial tone will then be received from the distant end (PBX/Key System). The user may then dial within the distant PBX/Key System.

A typical tie-trunk user application is shown below.



Question: Answer the following statement as either True or False.
E&M Tie-Trunks provide a link from a Telco Central Office to another Telco Central Office.

_____

NOTES

Answer:

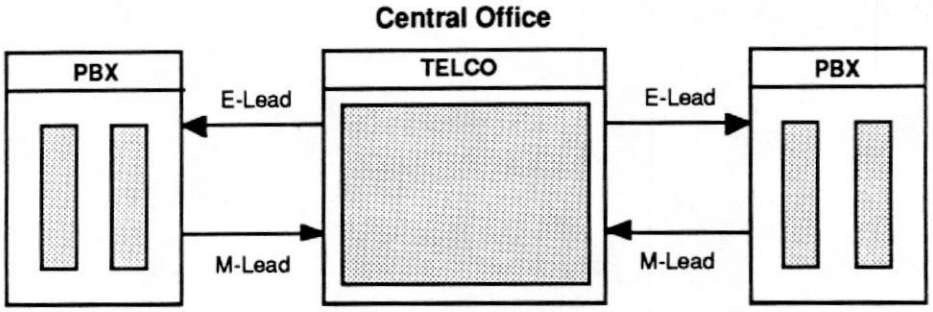
False

E&M Signalling - Overview

Two PBX/Key Systems in a private network are required to notify (signal) each other of the busy or idle status of the linking tie-trunk.

In E&M signalling configurations the voice circuits as well as the signal circuits can be either "two-wire" or "four-wire", dependent on the type of equipment being interfaced. The two dedicated signalling leads of E&M arrangements send and receive signals between the two linked switches.

The E-Lead of the PBX/Key System receives signals from the transmission circuit of the Central Office and the M-Lead of the PBX/Key System sends signals to the Central Office.



An easy way to remember the lead's function is to assimilate 'E' with Ear and 'M' with Mouth.

E&M signalling can be arranged in various configurations; however, for the scope of this course the two most common configurations will be discussed: Type I and Type II.

Question: Complete the following chart with either **send** or **receive**.

E = Ear = _____

M = Mouth = _____

NOTES

Answer:

E = Ear = Receive
M = Mouth = Send

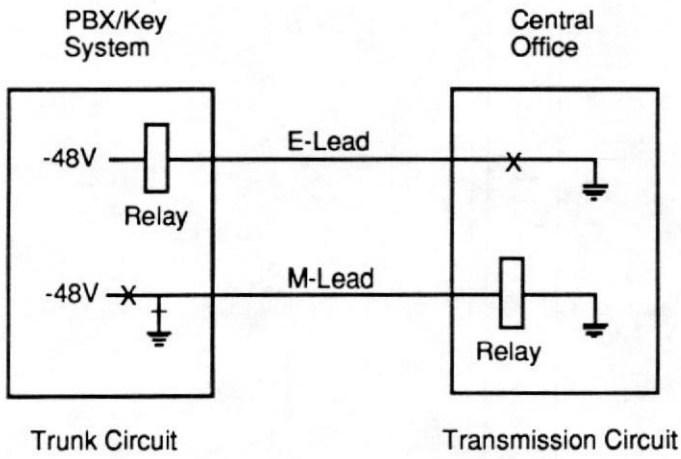
E&M Signalling - Type I

A simplified drawing of a Type I signalling arrangement is shown in the diagram below. Only one end of the transmission interface is shown; an identical configuration is at the other end (another PBX and CO). Note that the two Central Offices (CO) are connected together via the transmission circuit.

With Type I signalling the trunk circuit in the PBX/Key System receives the Idle or Busy status of the transmission circuit in the Central Office on the "E-Lead". When the contacts in the CO are open, an open condition exists on the E-Lead indicating that the transmission circuit is idle. When the transmission circuit in the CO operates, a ground is sent to the PBX trunk circuit indicating a busy condition.

The trunk circuit notifies the transmission circuit when the PBX/Key System is idle or busy via the "M-Lead". In this circuit, a ground (through the break set of contacts) indicates an idle trunk circuit. The trunk circuit sends a battery signal through the make contacts to the CO to indicates a busy trunk circuit condition.

Notice in the following diagram that the trunk circuit supplies the required battery for both the E-Lead and the M-Lead.



NOTES

E&M Signalling - Type I (continued)

Because Type I signalling sends the idle/busy status in one direction, from the trunk circuit to the transmission circuit, a common ground return path is required. As battery for both the E&M-Leads is supplied from the trunk circuit there is a high return current flow through the common ground resulting in interference to some electronic switching systems.

Type I E&M signalling operates satisfactorily for electro-mechanical switching. For electronic switching systems the interference in the return ground path could affect circuit operation and therefore a quieter circuit is generally required.

Question: From the diagram on the previous page, which circuit supplies the signalling battery?

_____

NOTES

Answer:

The trunk circuit

E&M Signalling - Type II

Type II E&M signalling uses a four-wire fully looped arrangement. Opens and closures are used to signal the idle/busy status of the respective circuit. An on-hook or idle status is identified by an open; an off-hook or busy status is identified by a closure.

Type II E&M tie-trunks are referred to as balanced circuits and are compatible with most electronic switching systems.

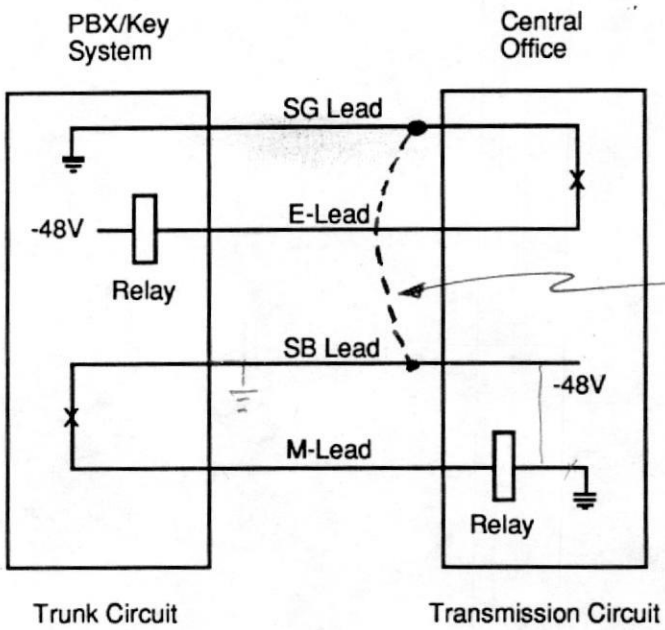
Specific wiring connections and charts will be covered in the next unit of this course.

Note: As Norstar employs Type II E&M signalling, ensure that you have a good understanding of its concept. This will also assist you with the Hardware and Troubleshooting sections of this course.

NOTES

E&M Signalling - Type II (continued)

The following diagram shows how the battery supplies for the E-Lead and the M-Lead are completely separate. Each circuit has its own battery signalling supply. In this fashion, high return ground currents and resulting interference is eliminated.



puente para modificar a tipo V

* IDLC

† cerrado

In the above diagram, Signal Ground is represented by the letters "SG" and Signal Battery is represented by "SB".

Question: Does an open or closure exist on the M-Lead when the trunk circuit is busy?

_____

NOTES

Answer:

A closure of the M-Lead exists when the trunk circuit is busy.

Norstar E&M

Norstar uses a Type II 8-wire E&M signalling arrangement: 4 wires for the voice path and 4 wires for the signalling path. Only Type II E&M Signalling is offered with Norstar, no other options are available.

Norstar E&M trunks may be either Manual Answer or Auto-Answer.

Manual Answer E&M trunks terminate as line appearances on Norstar telephone set line buttons and are answered in the ring-down fashion as regular loop start trunks.

Auto-Answer E&M trunks are answered automatically by the Norstar System and return either stuttered or system dial tone to the caller, dependent on system programming. Once the caller has obtained access to the Norstar system the incoming caller is then required to enter digits to steer his call to the desired function. The desired function may be to:

- dial the digits associated with a Target Line and thus calling directly to a telephone set.
- dial the digits associated with Remote Page to access the Norstar paging feature.
- dial the access code of a line pool. Once Line Pool access has been established, the caller may then enter the digits required to call out of the Norstar System.

Dialing must take place from a tone telephone set. Pulse dialing is not supported within Norstar.

Question: List the way(s) in which E&M Trunks may be answered.

_____

_____

NOTES

Answer:

Manual Answer
Auto Answer

Remote Access

Remote Access allows users elsewhere on the public or private network to call into a PBX/Key System and once into that system gain access to a subset of the system's resources.

Incoming calls which are allowed access to internal Norstar System features **must** be placed from a touch-tone telephone set. Pulse dialing is not supported.

Access to a private network from a set external to the PBX/Key System cost effectively enables the remote user to avoid long distance charges. Remote Access provides the ability for a remote user to access:

- Tie-Trunks within a private network.
- Local calling area.
- Features of the accessed system.

Remote Access may be used to allow an external caller access to the Norstar System to place an outgoing call through a line pool of E&M Tie-Trunks or other outgoing Central Office lines. (Only lines of the same type should be placed in the same line pool.)

The Remote Access feature permits people away from the office to make use of the Norstar's private or public network facilities remotely, to bypass the normal toll costs associated with using the public network.

Question: List the main advantage of Remote Access.

_____

_____

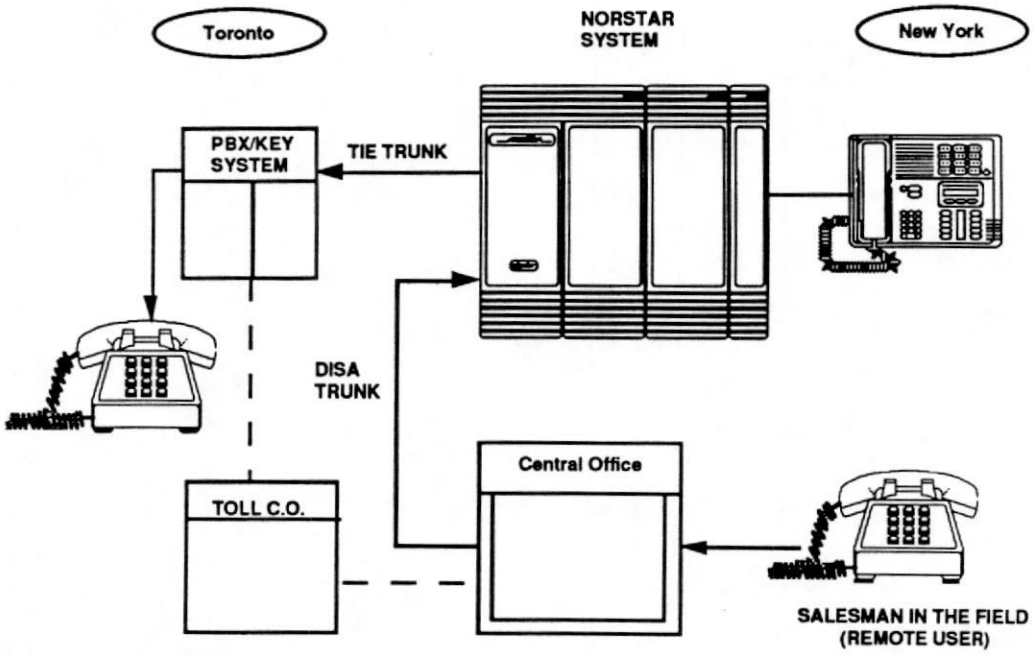
NOTES

Answer:

> *Remote Access cost effectively enables the remote user to avoid long distance charges.*

Remote Access (continued)

For example a salesperson in the field must place a call to Head Office in a different part of the country. The salesperson can call into his Norstar System in his own city and once access has been gained to the Norstar system can then access a line pool of E&M tie-trunks to the Head Office.



Question: Answer the following statement as either True or False. Write your answer in the space provided.

Norstar allows a remote caller to access associated Tie-Trunks of another system in the private network.

_____

NOTES

Answer:

True

Direct Inward System Access (DISA)

Direct Inward System Access (DISA) is a term used by Norstar to define a security feature which may be used to control remote access to the Norstar System.

Auto-Answer and E&M trunks can be configured to answer incoming calls with DISA. If the DISA security feature is selected during Configuration Programming, remote callers will hear a special stuttered dial tone and then must enter a Class Of Service Password that determines what they will be allowed to do in the system.

DID trunks cannot be configured to answer with DISA.

Question: Circle the best answer.

When a remote caller dials into an auto-answer trunk configured with DISA:

a. normal dial tone is presented to the caller.
b. system dial tone is presented to the caller.
c. stuttered dial tone is presented to the caller.

NOTES

Answer:

c. stuttered dial tone is presented to the caller.

Summary

The following are some of the key points to remember as you proceed through the remainder of the course.

1. Whether incoming calls are received by the Norstar System on Auto-Answer, DID, or E&M trunks, the same Target Line digits are accessible for the incoming caller to dial. In the case of DID trunks, the digits are actually sent to the Norstar System by the Central Office.

2. To control access from the public or private network, Auto-Answer and E&M trunks may be configured to answer with DISA.

Please keep in mind that programming and use of the features being presented now will be explained in detail in appropriate sections of the course.

NOTES

REVIEW QUESTIONS

Place the name of the circuit or Norstar feature next to the definition which best matches its function.

Trunk	Line	Auto-Answer
DID Trunk	Target Line	Remote Access
E&M Tie-Trunk		DISA

_____ Allows an external caller to bypass the attendant and call directly to a specific destination.

_____ A physical connection between switching machines.

_____ A physical connection between a telephone set and a switching machine.

_____ Calls are automatically answered by Norstar, System security may be preserved through the use of a password.

_____ A communications path set up when Norstar matches received digits to a called destination.

_____ A physical connection between switching machines within a private network.

Upon completion of the above questions, have your Course Administrator check your answers or check your answers with the answers in the Appendix of this manual.

When you are ready to continue, please turn the page and begin reading Unit 2 - Hardware Overview.

NOTES

UNIT 2 - HARDWARE COMPONENTS

DR4 features are provisioned through enhanced software of the Feature Cartridge. To support the functions and features associated with DR4, two additional Trunk Cartridges have been developed.

The E&M Trunk Cartridge interfaces tie-trunks into the Norstar System and the DID Trunk Cartridge interfaces DID trunks into the System.

All existing KSUs, Trunk Modules, and Station Modules are compatible with the DR4 Feature Cartridge, the E&M/DISA Trunk Cartridge, and the DID Trunk Cartridge. To gain full advantage of DR4's capabilities, Disconnect Supervision hardware is required.

When handling Feature Cartridges and Trunk Cartridges ensure that all Electrostatic Discharge precautions are followed. Avoid touching the contacts of the printed circuit boards. These are electrostatic sensitive devices.

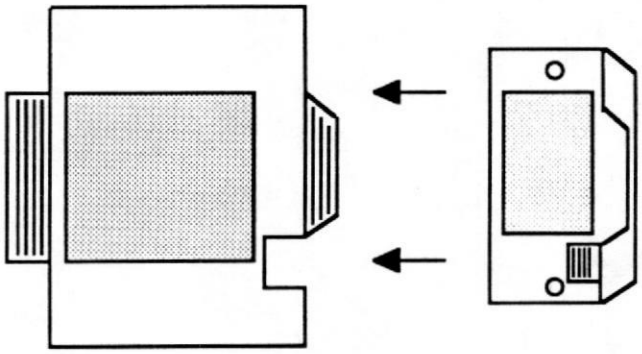
Upon completion of this Unit of instruction, you will be able to list the steps required to upgrade Modular DR2 or DR3 software to DR4 software. You will also be able to document trunk cartridge capacities when provisioning Norstar Systems for E&M tie-trunks, DID trunks, and DISA service.

NOTES

The DR4 Feature Cartridge

The DR4 Feature Cartridge is designed physically the same as the DR3 Feature Cartridge. Both are comprised of two sections; the Data Cartridge (RAM - Random Access Memory) and the Software Cartridge (ROM - Read Only Memory) house the customer programming and the DR4 software, respectively. A "DR4" label on the end of the software section identifies that DR4 software is operating in the KSU.

Data Cartridge **Software Cartridge**



The Maintenance Session within Configuration Programming may be used to identify if DR4 software is operating in the system or if the DR4 Feature Cartridge is installed.

Norstar Modular Systems may be upgraded from DR2 or DR3 software to DR4 software. DR4 software is supplied in two kits. One kit is made up of the Software Cartridge only,to upgrade from DR3 to DR4. The other kit containing both sections of the Feature Cartridge is used for new DR4 installations and also to upgrade from DR2 to DR4.

Question: List the two sections which comprise the DR4 Feature Cartridge.

_____

_____

NOTES

Answer:

Software Cartridge
Data Cartridge

DR3 to DR4 Upgrade

Upgrading from DR3 to DR4 software is a relatively easy procedure.

1. Ensure that there is no call activity on the system.
2. Remove the power to the KSU and all associated modules. Disconnecting the power not only ensures protection for the electronic components but also ensures that the data stored in the features cartridge will not be corrupted.
3. Remove the DR3 Feature Cartridge from the KSU as one complete unit.
4. Remove the DR3 Software Cartridge from the Data Cartridge.
5. Insert the DR4 Software Cartridge into the Data Cartridge.
6. Insert the assembled Feature Cartridge into the KSU.
7. Connect power to the system.
8. After the system has initialized, program the features associated with DR4 software.

With the exception of Restrictions, all previously programmed customer data remains intact. The system is ready to program and accept DR4 programming parameters tailored to the customer's requirements after the system is initialized.

Question: Give the two reasons for ensuring that power is not connected to the KSU when performing a feature cartridge upgrade.

_____

_____

_____

NOTES

Answer:

> *Disconnecting the power not only ensures protection for the electronic components but also ensures that the data stored in the features cartridge will not be corrupted.*

DR2 to DR4 Upgrade

The upgrade from DR2 to DR4 requires some extra steps necessitated by the physical difference between the two types of feature cartridges and by the differences of internal components. DR2 is built into a one-piece cartridge while DR3 and DR4 employ a two-section cartridge.

The upgrade procedure requires first upgrading the system to DR3 and second upgrading the system from DR3 to DR4. The first step removes the customer data stored in the KSU and transfers it to the Data Cartridge section of the new cartridge, resulting in upgrading the system from DR2 to DR3. The second step consists of upgrading from DR3 to DR4 and programming the DR4 parameters.

Question: Which section of the DR4 Feature Cartridge contains the information specific to customer requirements.

_____

NOTES

Answer:

The Data Cartridge

DR2 to DR4 Upgrade (continued)

The procedure used to upgrade from DR2 to DR4 is listed below:

1. Ensure that there is no call activity on the system.
2. Remove power from the KSU and associated modules.
3. Remove the DR2 feature cartridge from the KSU.
4. Insert a DR3 Software Cartridge into the **new** DR4 Data Cartridge.
5. Insert the complete feature cartridge into the KSU.
6. Power up the system.
7. After the system initializes, wait until all sets in the system display the time and date. On large systems this may take several minutes. This procedure ensures that the information stored in the KSU has been transferred to the Data Cartridge.
8. Remove power from the KSU.
9. Remove the feature cartridge from the KSU.
10. Remove the DR3 Software Cartridge from the Data Cartridge.
11. Insert the DR4 Software Cartridge into the Data Cartridge which was just removed from the KSU.
12. Insert the assembled feature cartridge into the KSU.
13. Connect power to the system.
14. After the system has initialized, program the features associated with DR4 software.

Important: A **new** Data Cartridge **must** be used. A new Data Cartridge is defined as one which has never been installed in a Modular System. The date and time have never been changed.

Question: At what steps in the above procedure must power be applied to the KSU?

_____

NOTES

Answer:

Step 6 initializes the system with DR3 software
Step 13 initializes the system with DR4 software.

E&M/DISA Trunk Cartridge

An E&M/DISA Trunk Cartridge is required to implement E&M Tie Trunk connectivity. The E&M/DISA trunk cartridge is identified by the label "E&M/DISA" on the front of the cartridge. They are installed in the trunk module in the same manner as loop start trunk cartridges. Unlike loop start trunk cartridges which contain circuitry to interface four (4) trunks into the Norstar System, E&M/DISA trunk cartridges provision for two (2) tie-trunks. Maximum system capacity is reduced whenever E&M/DISA trunk cartridges are installed.

In addition to two DTMF (Dual Tone Multi Frequency) receivers required for the two E&M Tie-Trunks, the E&M/DISA trunk cartridge contains two spare DTMF receivers which connect directly to the system's bus. These spare DTMF receivers are used to interpret the digits that the Norstar is expecting to see for incoming DISA calls on loop start trunk cartridges, configured for Auto-Answer.

Incoming calls to the system which require access to internal Norstar System features **must** be placed from a touch-tone telephone set. Pulse dialing is not supported.

Question: What is the total number of DTMF receivers on an E&M/DISA trunk Cartridge?

_____

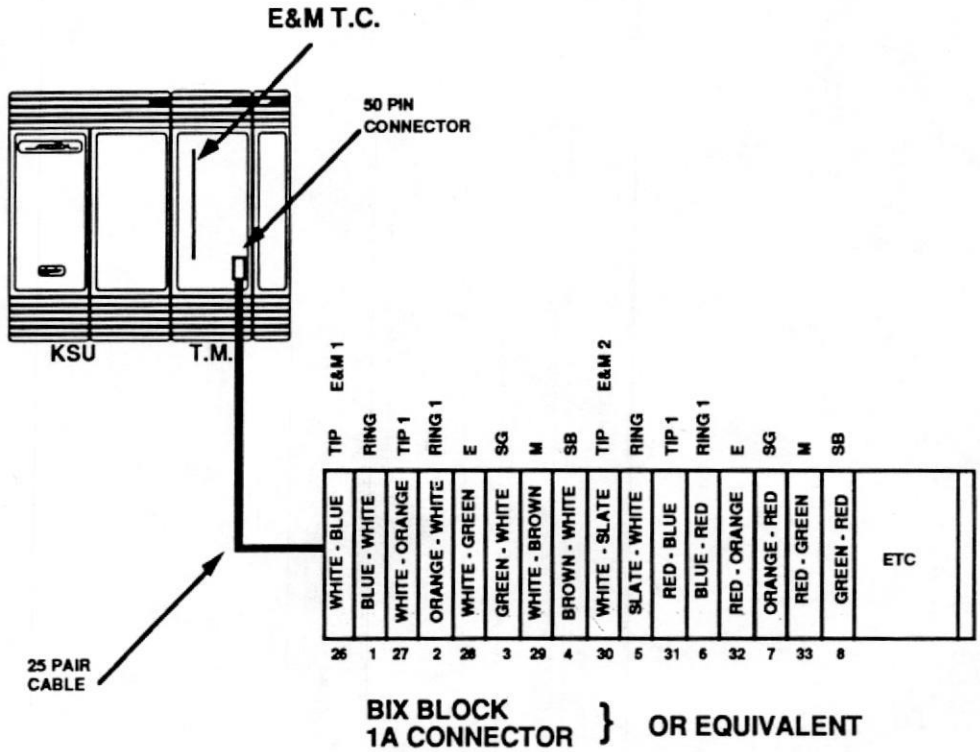
NOTES

Answer:

Four

E&M/DISA Trunk Cartridge (continued)

The E&M/DISA trunk cartridge wiring chart shown below depicts the pin locations where the physical connections are made to interface with the Telco cable pairs. The colors shown pertain to the first slot of the Trunk Module. Wiring charts showing the connections when the E&M/DISA trunk cartridge is installed in other module slots are located in the Technical Data section of the Installer Guide.



Question: From the wiring charts in the Installer Guide, give the color of the E-Lead for the first E&M Tie-Trunk installed in slot 2 of the Trunk Module.

_____

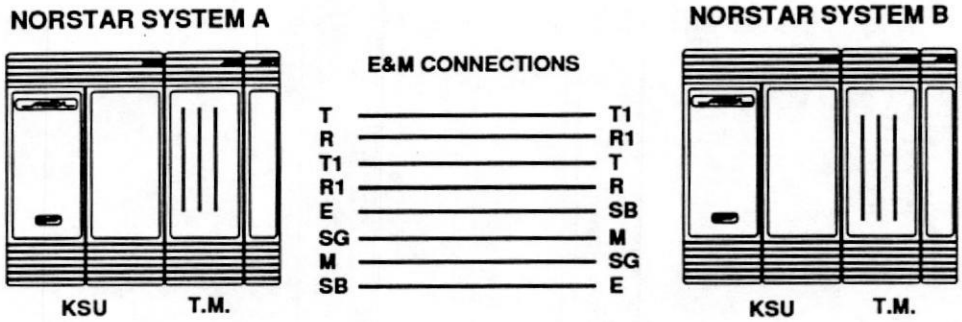
NOTES

Answer:

Black-Blue

E&M/DISA Trunk Cartridge (continued)

The following diagram shows the connections necessary for connecting two Norstar Systems together via E&M Trunks.



Norstar E&M/DISA trunk cartridges use a Type II signalling arrangement. All eight (8) leads must be connected.

Notice in the diagram that the Tip lead of System 'A' is connected to the 'Tip 1' lead of System 'B'. The roll-over is consistent with all 8 leads shown for each E&M trunk.

As an example of E&M operation, a user in System B wishes to place a call to a station in System A. The System B caller seizes the tie-line to System A by manually selecting the appropriate line button.or dialing the appropriate line pool access code. The E-Lead of System A detects the M-Lead and SB-Lead closure from System B. System A then returns dial tone to System B on the T1 and R1 Leads which are connected to System A's T and R Leads. The System B caller may now enter the digits required to signal the desired station within System A.

Question: Fill in the blank. From the above diagram, the M-Lead of System 'A' is connected to the _____ lead of System 'B'.

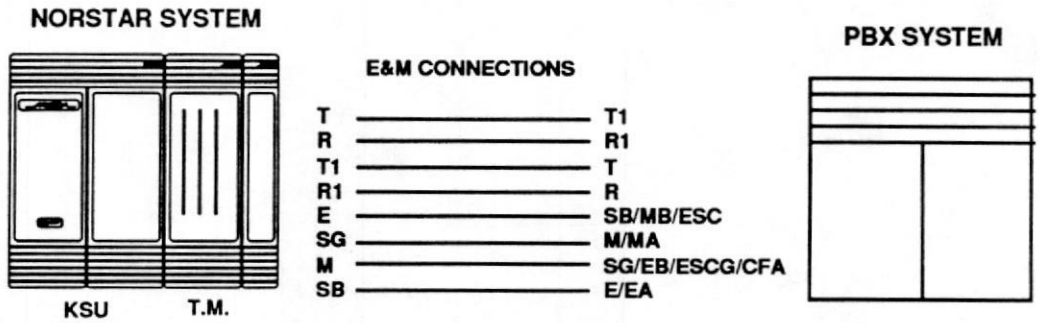
NOTES

Answer:

SG Lead

E&M Trunk Cartridge (continued)

The diagram below shows a typical E&M trunking situation connecting a Norstar to a PBX. The designations on the PBX side of the diagram show the lead names which could be used by various manufacturers.



Question: List all of the lead designations used by various manufacturers for the SB Lead.

_____

_____

_____

NOTES

Answer:

SB; MB; ESC

DID Trunk Cartridge

A DID Trunk Cartridge is required to implement DID trunk connectivity to a Norstar System. The DID trunk cartridge is identified by the label "DID" on the front of the cartridge. DID trunk cartridges are inserted into trunk modules in the same fashion as other Norstar trunk cartridges.

A DTMF receiver for each of the four (4) DID trunk positions is included within the circuitry of the cartridge to decode the incoming digit stings.

Each DID trunk cartridge interfaces four (4) incoming DID trunks into the System. Using the suggested ratio of six (6) CO directory numbers to one DID trunk, each Norstar DID trunk cartridge concentrates many more CO directory numbers into the system as compared to the one to one ratio of loop start trunk cartridges.

Question: How many DTMF receivers are there on one DID trunk cartridge?

_____

NOTES

Answer:

Four (4)

DID Trunk Cartridge (continued)

Using the suggested ratio of 6 CO directory numbers for each DID trunk, a possible number of 24 CO directory numbers could be interfaced into the Norstar System through each DID trunk cartridge. Using this data it is easy to see that a problem in a DID Trunk Cartridge could result in many CO directory numbers to be out of service. To notify the Central Office of a DID trunk cartridge problem the DID trunk cartridge contains a Control Circuit Interface (CCI), dependent on local Telco provisioning.

The CCI connections provide an indication of the operation status of the DID Trunk Cartridge to the Central Office. An open CCI relay contact notifies the Central Office that the cartridge is fully operational. A closed relay contact is an indication that the DID trunk cartridge is not capable of handling incoming calls.

The CCI relay is triggered by any one of the following:

- Power failure of the Trunk Module.
- Detection of a DID Trunk Cartridge failure.
- DID Trunk Cartridge unable to communicate with the main processor.

When the Central Office detects a CCI relay closure from the DID Trunk Cartridge, it will either busy-out the affected trunk until the status indication changes to normal operation, forward the DID lines to other directory numbers, or terminate the DID lines on ordinary telephone sets.

Question: Give the prime function of the CCI relay contact.

_____

_____

_____

NOTES

Answer:

> *The CCI relay contact notifies the Central Office of the operational status of the DID Trunk Cartridge.*

DID Trunk Cartridge (continued)

One CCI relay is provided on each DID trunk cartridge. A cable pair for each trunk cartridge should be provided back to the Central Office. For example, if 3 DID trunk cartridges are installed in a Trunk Module, it is recommended to wire 3 CCI pairs to the Central Office, if the pairs are available for this purpose.

Note: Procedures for wiring CCI pairs to the Central Office will vary depending on local Telco requirements; the suggested wiring may not be applicable in all installations. Not all Telcos support the CCI feature.

To minimize the number of cable pairs back to the Central Office, the CCI pairs may be connected in either a parallel or series arrangement. It is important to note that in doing so reduces the validity of the CCI function.

1. If multiple CCI interfaces are wired in **parallel** and then connected to one cable pair, any of the DID trunk cartridges associated with those CCIs can signal its unavailability to receive calls and take all trunk cartridges out of service. This arrangement may unnecessarily disable functional trunk cartridges.

2. If multiple CCI interfaces are wired in **series**, then the arrangement would require 'all trunk cartridges' in the group to signal (via their respective closed relay contact) their unavailability to handle incoming calls. If a single trunk cartridge is unable to receive incoming calls and closes its CCI relay contact, the Central Office would be unable to detect the closure because of the open contacts on the other trunk cartridges.

Question: Answer the following statement as either True or False.

The most effective way of connecting the CCI contact to the Central Office cable pairs is to supply one cable pair for each trunk cartridge.

_____

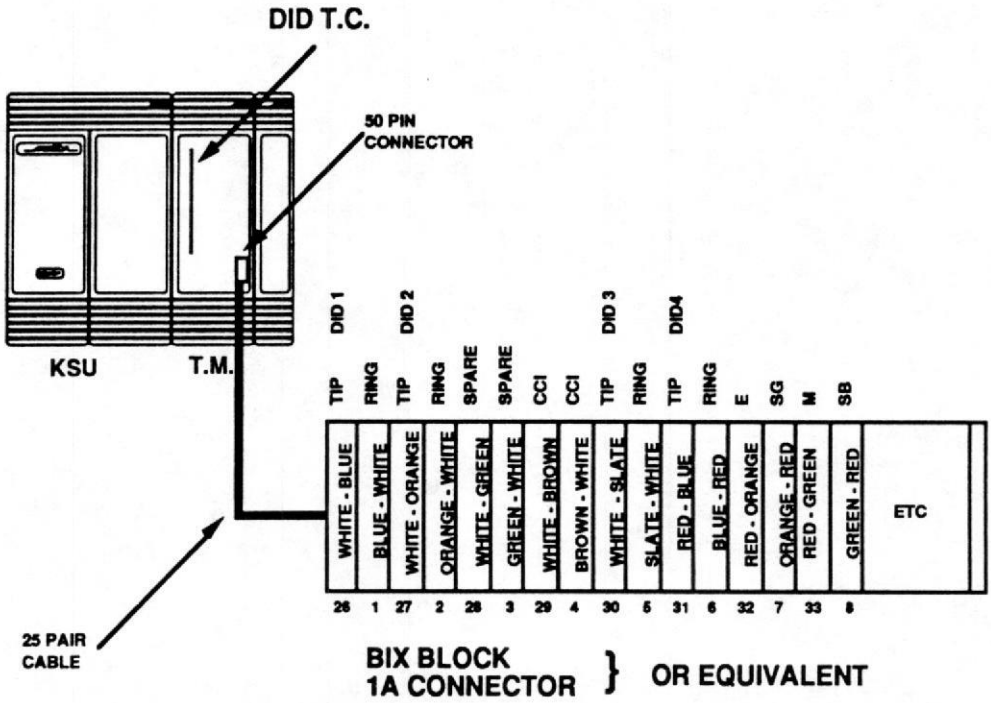
NOTES

Answer:

True

DID Trunk Cartridge (continued)

The wiring chart for the DID Trunk Cartridge is shown below. This chart only applies when the DID trunk cartridge is installed in Slot 1 of the trunk module..The Technical Data section of the Installer Guide contains complete wiring charts for all trunk module slots.



Question: From the Technical Data section of the Installer Guide, give the colors used to connect the Control Circuit Interface to the Telco cable pair for a DID trunk cartridge installed in slot 3.

_____

_____

NOTES

Answer:

Yellow-Slate
Slate-Yellow

Norstar System Provisioning

From the information previously presented in this Unit of the course you can see that various trunk cartridge configurations are necessary to provision a Norstar System to different customer specifications.

Loop Start, E&M/DISA, and DID trunk cartridges may all be installed in the same trunk module at the same time. When a mixture of trunk cartridges are installed, it is important to cross-connect the wiring for each type of trunk cartridge to a different distribution block.

To retain Emergency Telephone function with mixed service, a Loop Start or DID trunk cartridge should be installed in the first slot of the trunk module.

The following pages contain examples of Norstar Systems with Public and Private Network connectivity. A list of required hardware is included with each example.

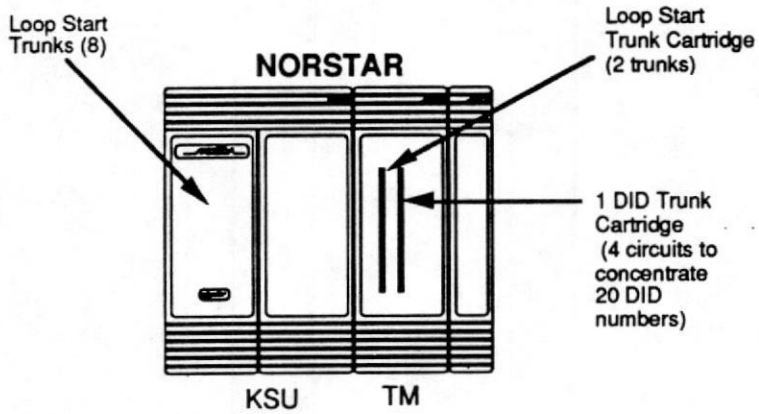
NOTES

Norstar System Provisioning (continued)

Example 1

A Norstar System connected to the Public Network with 20 DID directory numbers and 10 outgoing trunks would require:

1. A DR4 feature cartridge.
2. A trunk module to support additional trunk cartridges.
3. A DID trunk cartridge to support incoming DID trunks. (Although the recommended ratio of six DID numbers for each DID trunk is used for this example, individual customer requirements may differ dependent on the amount of incoming calls to the system.)
4. A Loop Start trunk cartridge to support 2 outgoing trunks. (8 trunks in the KSU and 2 trunks on the additional trunk cartridge).



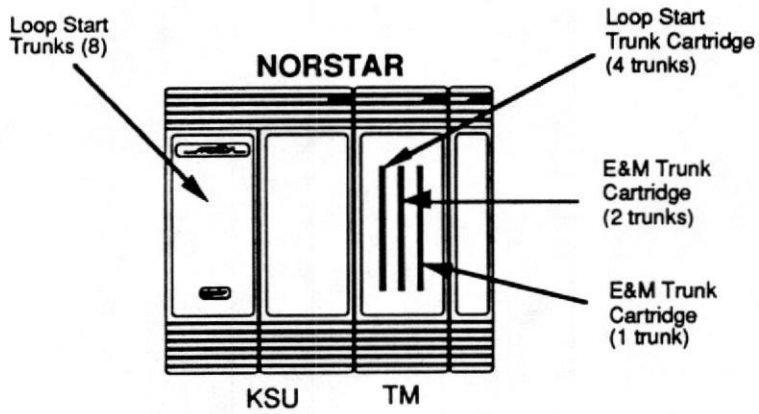
NOTES

Norstar System Provisioning (continued)

Example 2

A Norstar System connected to a Private Network with 3 E&M trunks and connected to the Public Network with 8 incoming loop start trunks and 4 outgoing trunks would require:

1. A DR4 feature cartridge.
2. A trunk module to support additional trunk cartridges.
3. Two E&M trunk cartridges (1 trunk cartridge for 2 trunks and 1 trunk cartridge for the remaining trunk).
4. A Loop Start trunk cartridge to support the four outgoing trunks.



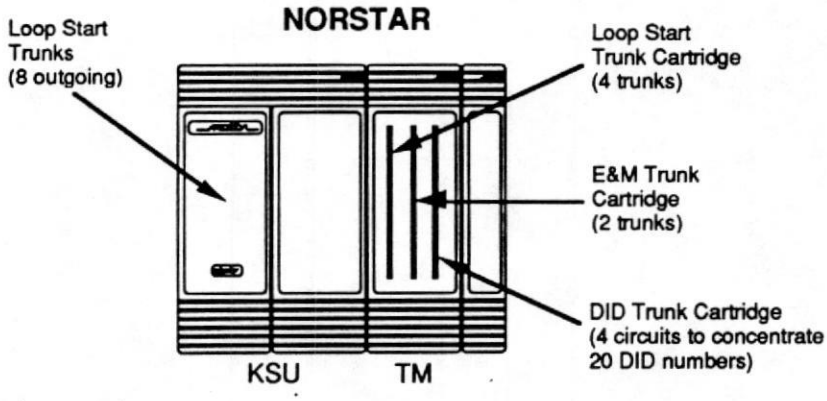
NOTES

Norstar System Provisioning (continued)

Example 3

A Norstar System connected to a Private Network with 2 E&M trunks and connected to the Public Network with 20 incoming DID trunks and 12 outgoing trunks would require:

1. A DR4 feature cartridge.
2. A trunk module to support additional trunk cartridges.
3. A DID trunk cartridge to support incoming DID trunks.
4. A Loop Start trunk cartridge to support 4 outgoing trunks
5. An E&M trunk cartridge to support 2 E&M trunks.



Question: Using the previous examples as a reference, how many Trunk Modules would be required to interface 4 E&M trunks and 16 incoming/outgoing Loop Start trunks?

_____

NOTES

Answer:

Two

Provisioning For Remote Access

Remote Access can be provisioned with Norstar DR4 using all three types of trunks.

Provisioning For Remote Access (Loop Start Trunks)

If Loop Start trunk cartridges are being used for remote access, then E&M/DISA trunk cartridges **must** also be installed. The E&M/DISA trunk cartridge is required to supply the necessary DTMF receivers to decode the incoming digits on the loop start auto-answer trunk. Loop start auto-answer trunks **must** be programmed as supervised.

As an example, a system with DISA numbers connected to a Loop Start trunk cartridge requires the installation of an E&M/DISA trunk cartridge. Each E&M/DISA trunk cartridge has two (2) spare DTMF receivers; loop start DISA trunks require a DTMF receiver to decode the incoming digits. To prevent calls from being blocked, it is suggested that each loop start auto-answer trunk have an associated DTMF receiver.

Provisioning For Remote Access (E&M Trunks)

If E&M trunks are programmed for remote access, the E&M/DISA trunk cartridge is all the hardware that is required. As previously mentioned, each E&M trunk interface on the E&M trunk cartridge has its own DTMF receiver.

Provisioning For Remote Access (DID Trunks)

If DID trunk cartridges are used, the system can be installed without further hardware requirements. DID trunk cartridges use their own DTMF receivers to decode the incoming digits.

Question: How many E&M/DISA trunk cartridges would be required to prevent blocked calls and provision a system for three (3) loop start DISA trunks?

_____

NOTES

Answer:

Two (2)

REVIEW QUESTIONS

1. What is the maximum number of E&M Trunks which may be interfaced into the Norstar through one Trunk Module?

   _____

2. Give the function of the spare DTMF receivers on the E&M Trunk Cartridge.

   _____

3. A new DR3 Feature Cartridge is one that the _____ and _____ have never been set.

4. List the two major steps required when upgrading from DR2 software to DR4 software.

   _____

   _____

5. Each DID Trunk Cartridge interfaces _____ DID trunks into a Norstar System.

6. If a Norstar System contained 2 DID trunk cartridges, how many CCI pairs would you suggest be installed for DID trunk cartridge monitoring?

   _____

After completing the above questions, have your Course Administrator check your answers or check your answers with the answers in the Appendix of this manual.

NOTES

Answer:

Auto-Answer
Selective Line Redirection
Unsupervised Conference

Programming Loop Start Trunks (continued)

The "Answer Mode" sub-heading is used to determine how incoming calls to the Norstar System will be answered.

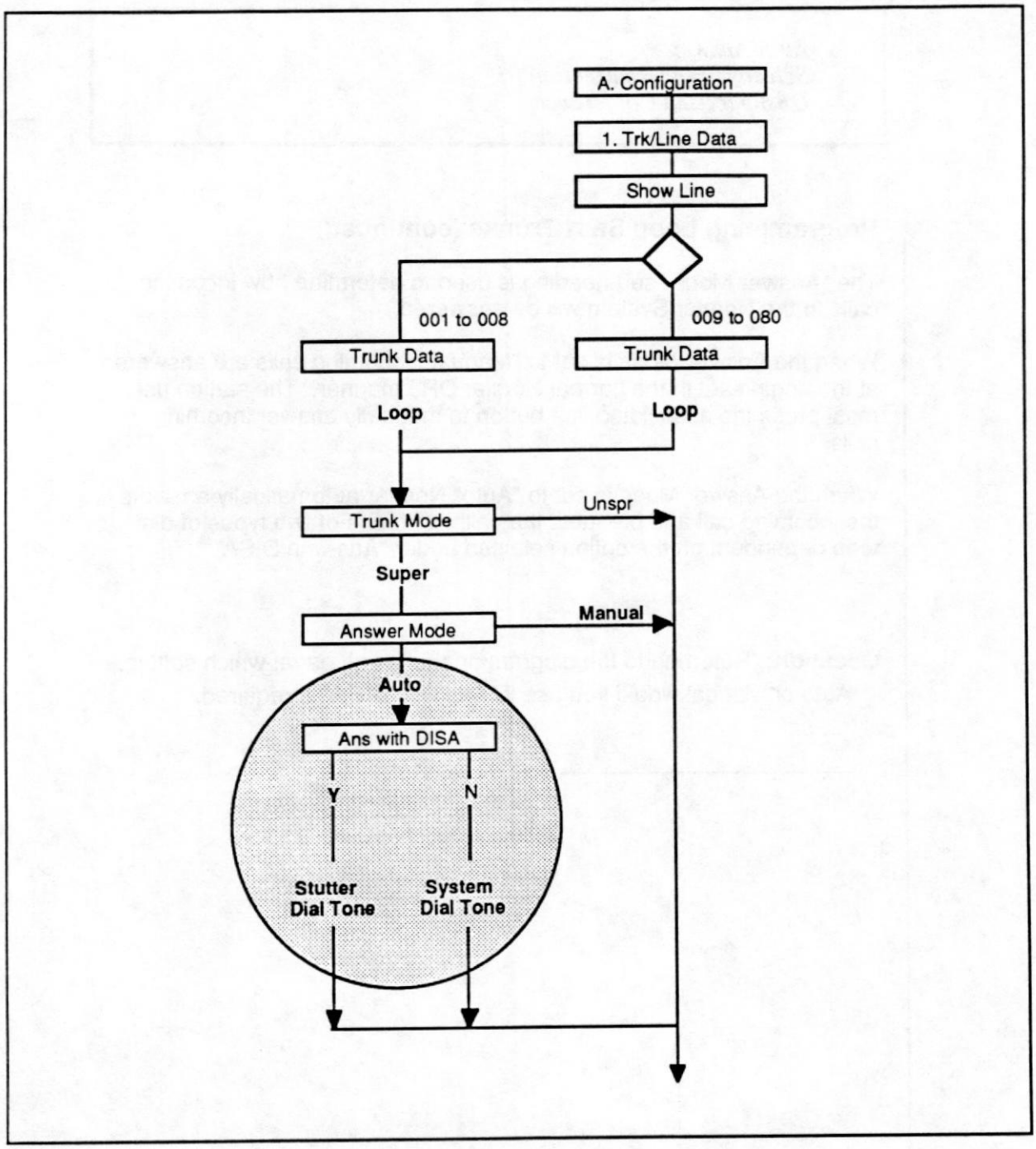
When the Answer Mode is set to "Manual", incoming calls are answered at the ringing set in the normal Norstar DR3 manner. The station user must press the associated line button to manually answer incoming calls.

When the Answer Mode is set to "Auto" Norstar automatically answers the incoming call and presents the caller with one of two types of dial tone dependent on the option selected under "Ans with DISA".

Question: Referring to the diagram on the facing page, which setting, Auto or Manual would you use if "Ans with DISA" is required.

_____

LOOP START TRUNK PROGRAMMING



Answer:

Auto

Programming Loop Start Trunks (continued)

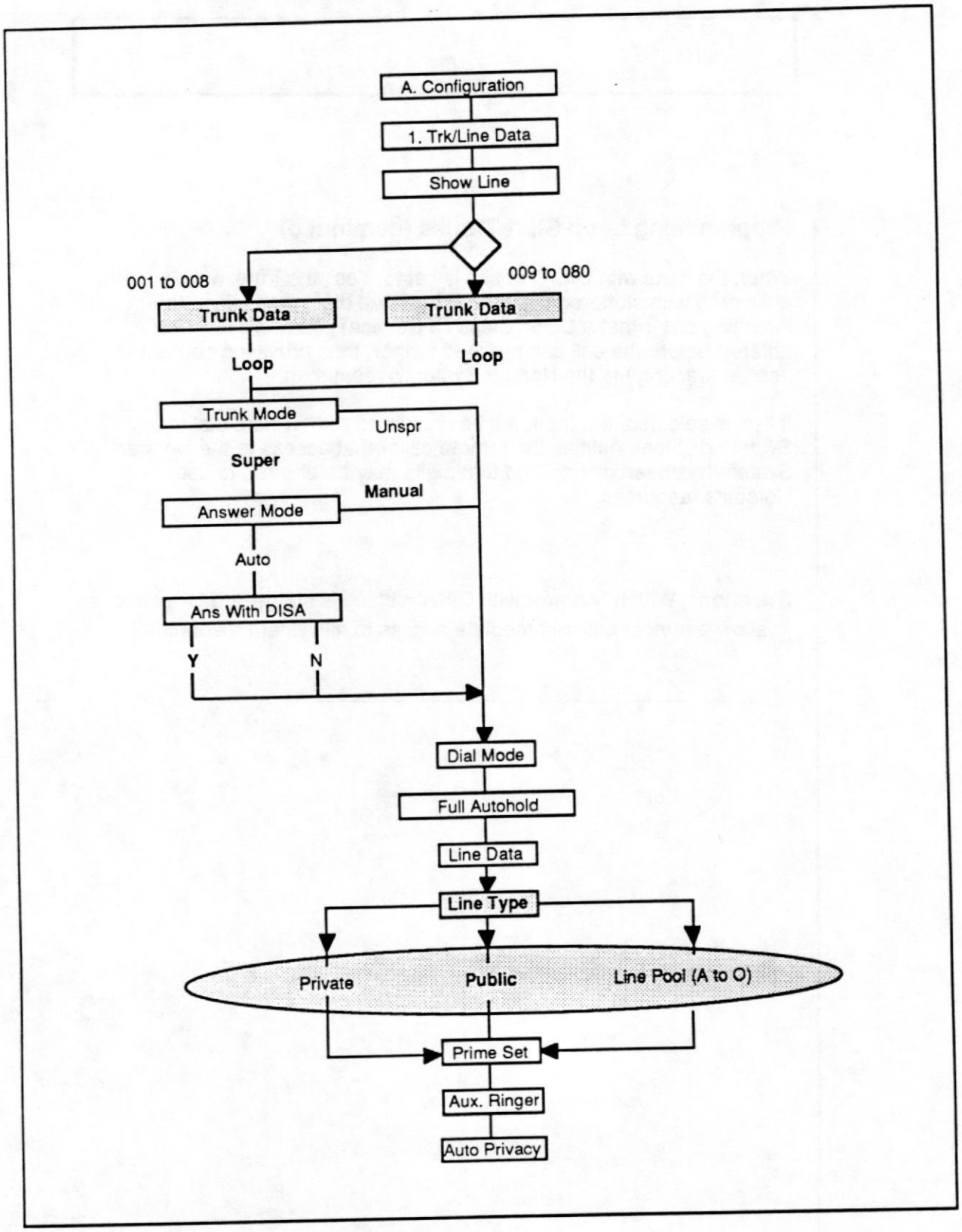
When the "Ans with DISA" option is set to 'Yes', the trunk will be answered with stuttered dial tone. Stuttered dial tone notifies the incoming caller that a COS (Class Of Service) password must be entered before the call can proceed further, thus providing controlled access (security) to the Norstar System's resources.

If 'No' is selected, the trunk will be answered with system dial tone. System dial tone notifies the remote caller that access to the Norstar System has been gained and that digits may be entered to use Norstar's resources.

Question Which "Answer with DISA" setting is suggested for use to allow a remote caller immediate access to all system resources?

_____

LOOP START TRUNK PROGRAMMING



Answer:

No

Programming Loop Start Trunks (continued)

After the "Trunk Data" information has been entered, the next heading to be programmed is "Line Data". Under this heading, the line type must be defined either as Public, Private, or in a line pool.

Loop start trunks which are placed in a line pool are generally used for placing outgoing calls and are programmed for manual answer.

Line pools are now identified by a letter of the alphabet from 'A' to 'O'.

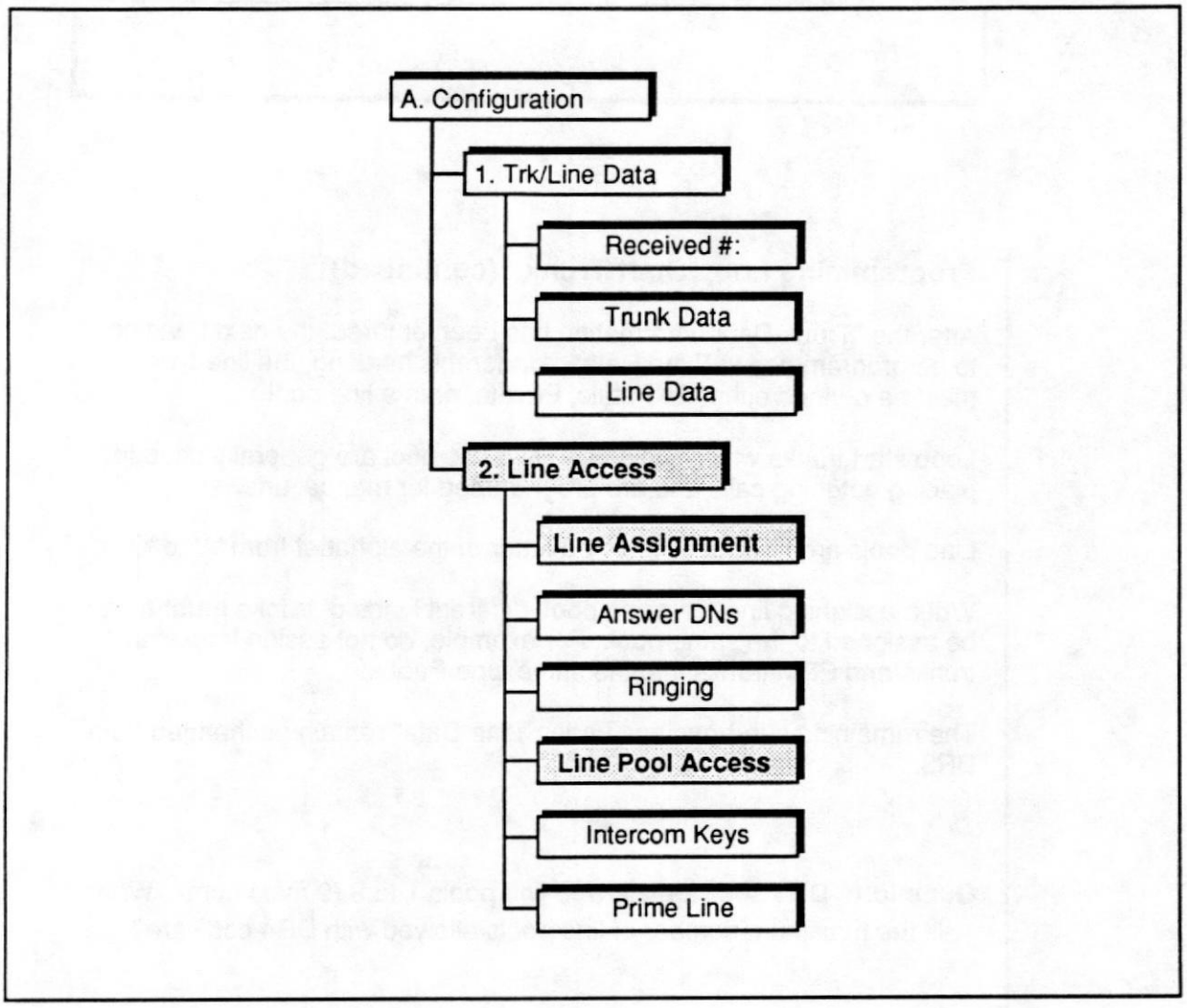
When assigning lines to a line pool, different kinds of trunks **must** never be assigned to the same pool. For example, do not assign loop start trunks and E&M trunks into the same Line Pool.

The remaining sub-headings under "Line Data" remain unchanged from DR3.

Question: DR3 software allowed line pools 1 to 9 (9 maximum). What is the maximum number of line pools allowed with DR4 software?

_____

LINE ACCESS PROGRAMMING CHART



Answer:

15

Programming Loop Start Trunks (continued)

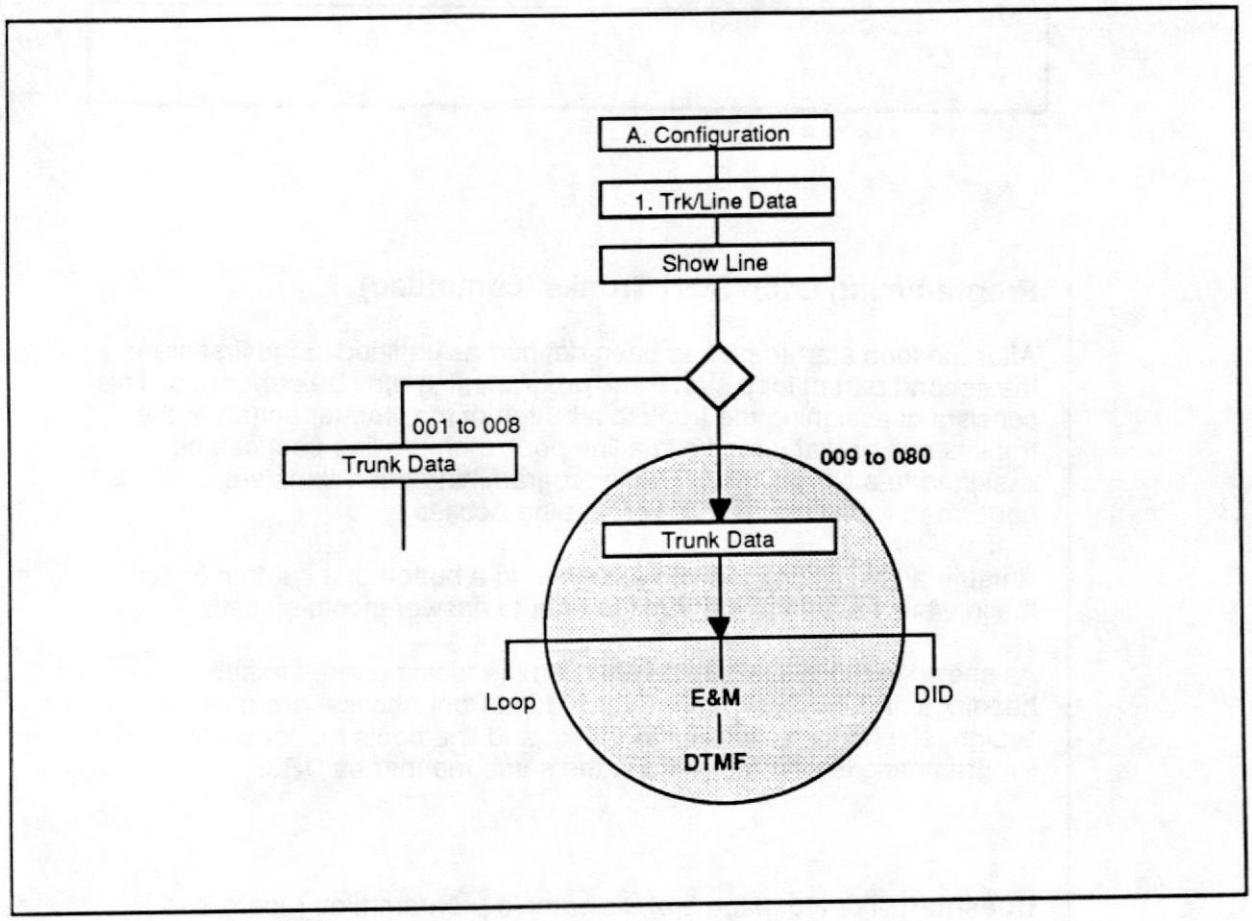
After the loop start trunk has been defined as outlined in the first step; the second part of loop start trunk programming may be performed. This consists of assigning the trunk to a button of the Norstar set(s). If the trunk is one of many trunks in a line pool, then the line pool can be assigned to a Norstar set. These programming operations are performed within the heading of "2. Line Access".

An auto answer trunk may be assigned to a button of a set to monitor the idle/busy status of the trunk but not to answer incoming calls.

As shown in the programming chart on the facing page, the sub-headings of "Line Assignment" and " Line Pool Access" are used to assign telephone set access to trunks and line pools respectively. Programming is accomplished in the same manner as DR3.

Question: Turn to page 5 of the sample programming record and program the Line Access assignments as shown, into your captive system.

E&M TRUNK PROGRAMMING CHART



Programming E&M Trunks

Programming for E&M trunks consists of programming the same two basic steps as loop start trunks. E&M trunks are first programmed with the required Trunk Data and Line Data information.; then, if the trunk is configured for manual answer, it is assigned either to Norstar sets as line appearances or as a line in a line pool.

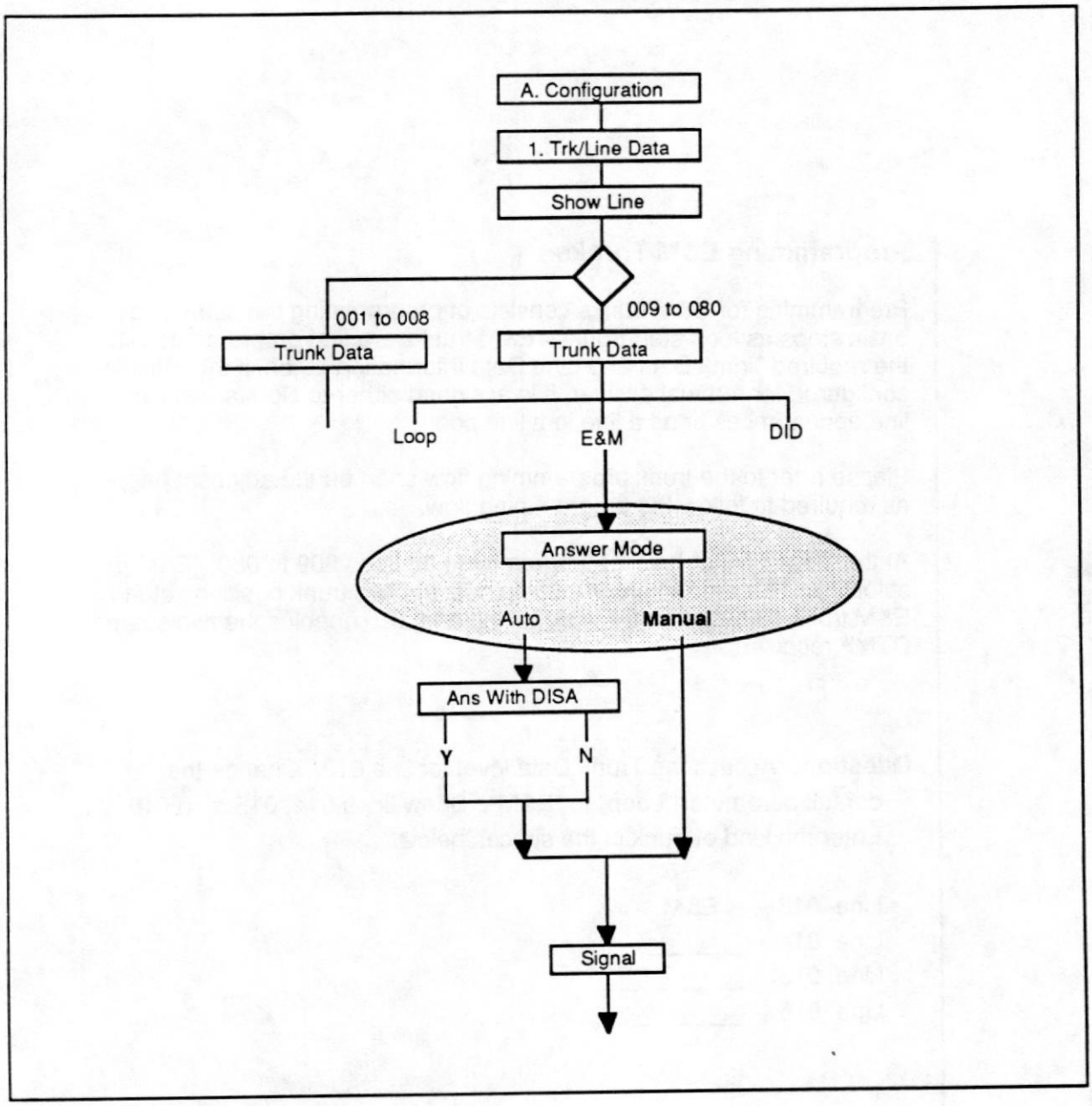
Please refer to the trunk programming flow chart on the adjacent page as required to follow the programming flow.

At the "Trunk Data" level of programming for lines 009 to 080, "E&M" is selected. This area of programming sets the two trunk positions of the E&M trunk cartridge for E&M signalling and also enables the two spare DTMF receivers.

Question: Access the Trunk Data level for line 013. Change the default parameter "Loop" to "E&M". Show lines 014, 015, and 016. Enter the kind of trunk in the spaces below.

Line 013 - E&M
Line 014 - _____
Line 015 - _____
Line 016 - _____

E&M TRUNK PROGRAMMING CHART



Answer:

Line 014 - E&M
Line 015 - DTMF
Line 016 - DTMF

Programming E&M Trunks (continued)

The "Answer Mode" heading may be set to one of two modes: "Manual" or "Auto". The answer mode for each trunk determines the type of call answering that will be applied to incoming calls on that trunk.

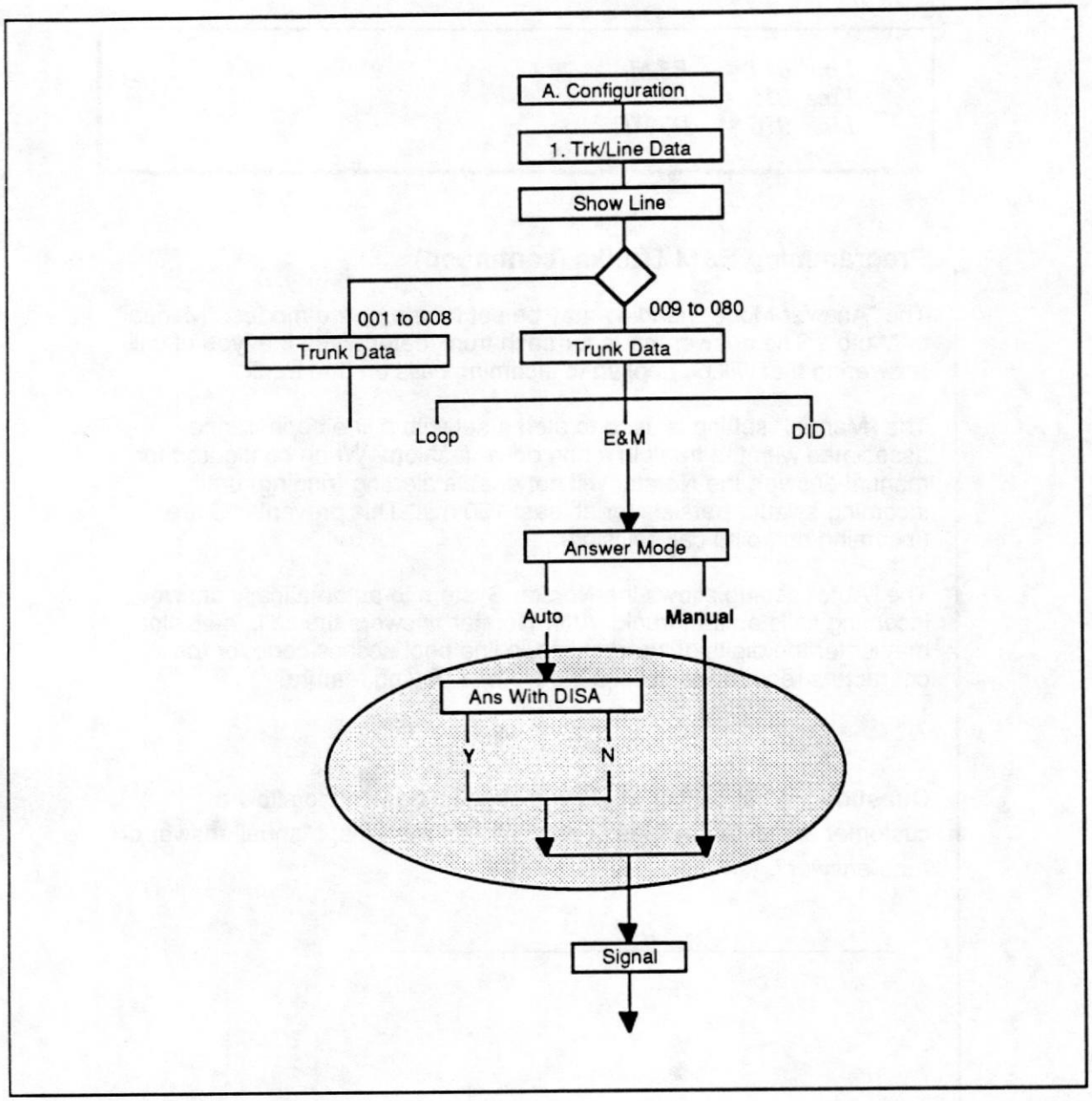
The "Manual" setting is used to alert a set with a line appearance associated with the trunk in a ring down fashion. When configured for manual answer, the Norstar will not enable alerting (ringing) until incoming seizure persists for at least 150 ms. This prevents "Glare" (incoming/outgoing call collision).

The "Auto" setting allows the Norstar System to automatically answer incoming calls on that trunk. After Norstar answers the call, the caller may enter the digits of a target line, a line pool access code, or the characters required to access the Norstar paging feature.

Question: What setting would you suggest be used to allow a customer to dial target lines of each other's systems; Manual answer or Auto answer?

_____

E&M TRUNK PROGRAMMING CHART



Answer:

Auto Answer

Programming E&M Trunks (continued)

When the Answer Mode is configured to automatically answer incoming calls, a decision must be made whether the system should or should not answer calls with DISA.

When E&M trunks are employed as part of a private network security of the private system is not usually of great concern. Generally, users in one location are required to call to another location and use the other system's resources. In this type of situation the "Ans with DISA" option would be programmed to "No".

On some occasions the customer may require restrictive use of the E&M trunking facility. In these instances the trunk may be configured to answer with DISA (programmed as "Yes"). When this setting is programmed as 'Yes', the system will return stuttered dial tone to the caller. The caller is then required to enter a COS password before the call is allowed to proceed.

An auto answer E&M trunk may be assigned to a button of a set to monitor the idle/busy status of the trunk but not to answer incoming calls.

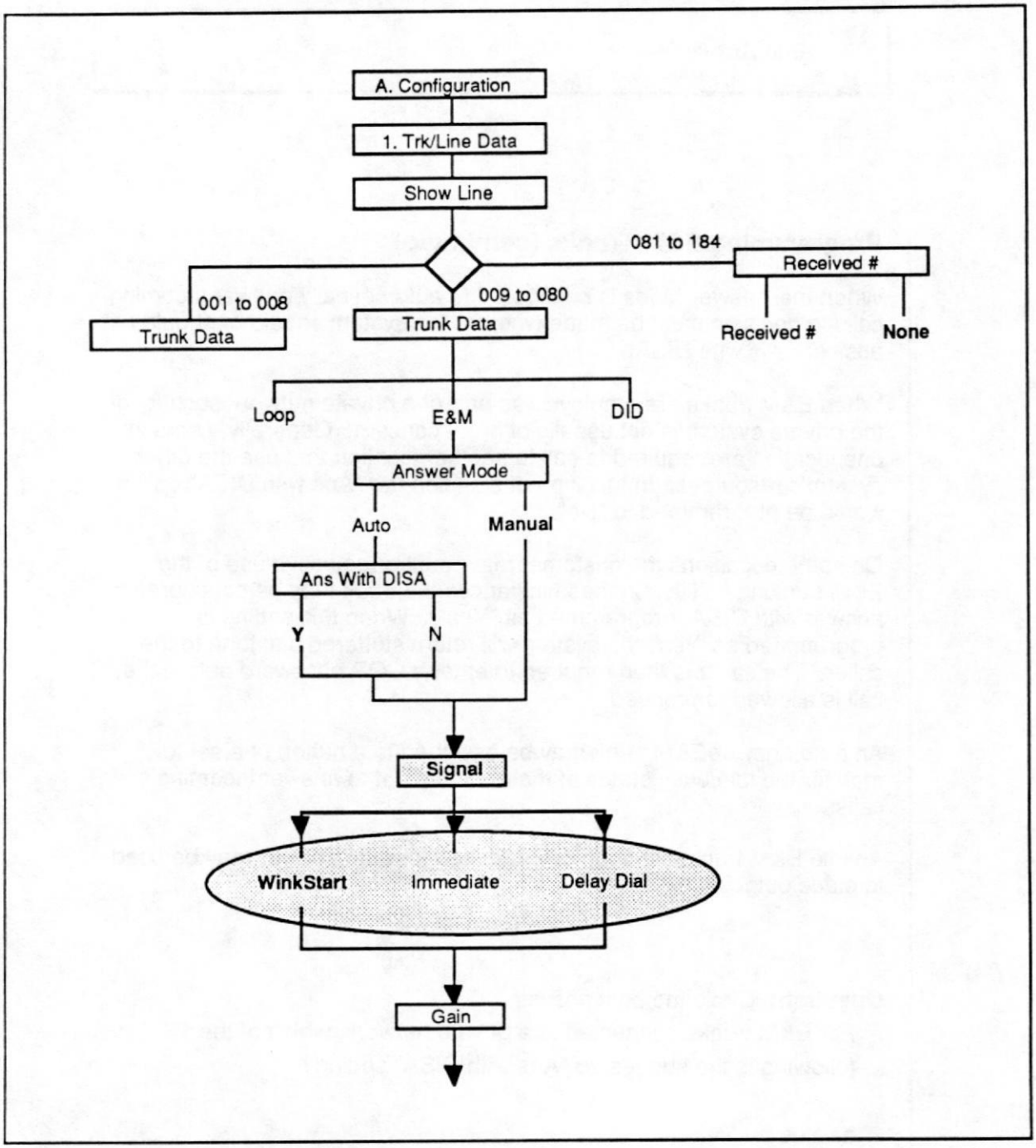
An idle E&M trunk, although programmed for auto answer may be used to place outgoing calls.

Question: Circle the best answer.

For E&M trunks connected to a private network, which of the following is the suggested "Ans with DISA" setting?

a. Yes
b. No
c. None

E&M TRUNK PROGRAMMING CHART



Answer:

b. No

Programming E&M Trunks (continued)

After the auto answer heading is set, the next level to be programmed is "Signal". Flexibility in choosing the signal type of supervision is provisioned such that Norstar can be configured to access both analog and digital Central Offices. One of the three options available (Immediate Start, Wink Start, or Delay Dial) is selected to match the requirements of the host Central Office.

When Norstar is set for "Immediate Start", the trunk is ready to register incoming dial pulses within 65 ms of Central Office seizure. Immediate Start signalling uses 'dial pulse' addressing only and would be used in conjunction with an analog Central Office.

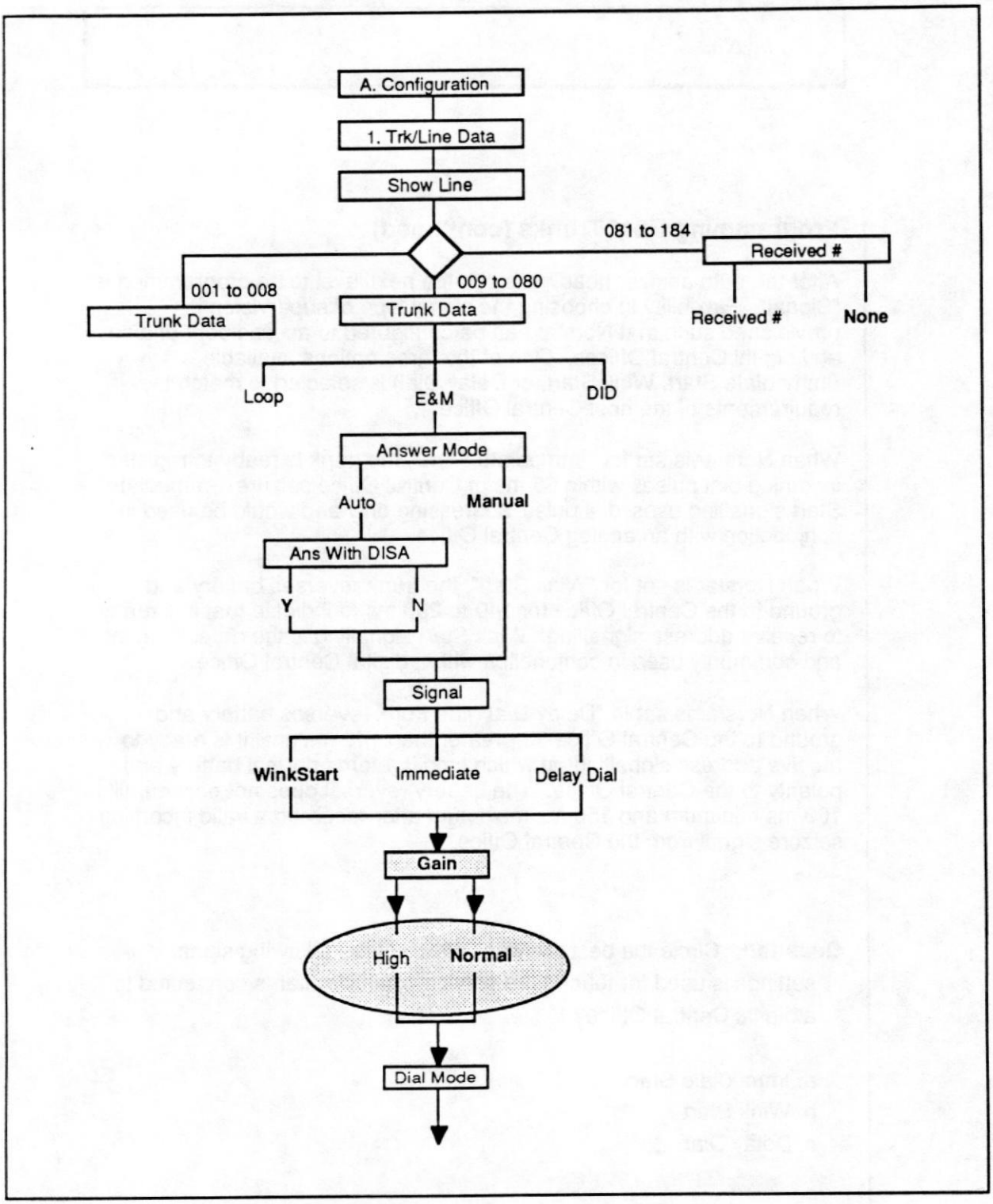
When Norstar is set for "Wink Start", the trunk reverses battery and ground to the Central Office for 140 to 290 ms to indicate that it is ready to receive address signalling. Wink Start signalling is the default setting and commonly used in conjunction with a digital Central Office.

When Norstar is set to "Delay Dial", the trunk reverses battery and ground to the Central Office for greater than 140 ms until it is ready to receive address signalling, at which time it returns normal battery and polarity to the Central Office. The battery reversal does not occur until 100 ms minimum and 150 ms maximum after receiving a valid incoming seizure signal from the Central Office.

Question: Circle the best answer. Which of the following signal settings is used for touch tone service when Norstar is connected to a digital Central Office?

a. Immediate Start
b. Wink Start
c. Delay Dial

E&M TRUNK PROGRAMMING CHART



Answer:

b. Wink Start

Programming E&M Trunks (continued)

The "Gain" heading within E&M trunk programming offers two options: normal and high. This setting is necessary to control the transmission levels of the tie-trunk circuit.

The "normal" value is used when:

1. Systems are connected directly to each other such that no loss or gain to the signals being transmitted is expected.

2. Systems are connected to each other through a Telco's carrier facility that may introduce a loss to the signal being transmitted.

The "high" value is used when:

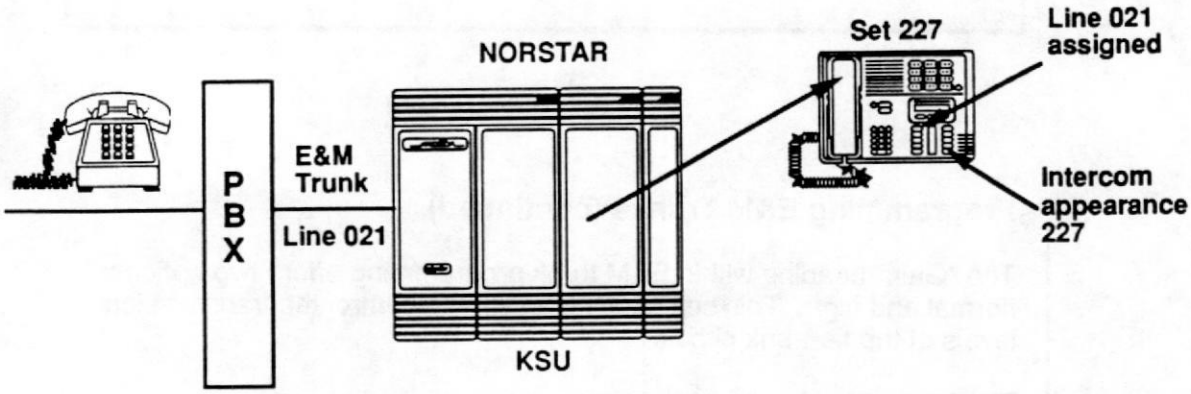
1. Systems are connected to each other through a Telco's carrier facility that may introduce a gain (an increase in volume) to the signal being transmitted.

After the appropriate gain setting has been selected, the remainder of E&M trunk programming is the same as loop start trunk programming.

Question: Which "Gain" setting would you suggest be used when a Norstar System is connected directly to a PBX; Normal or High? No loss or gain to the signals is expected.

_____

MANUAL ANSWER E&M TRUNK



Required Programming

FOR THE PHYSICAL TRUNK

A. CONFIGURATION
1.TRK/LINE DATA
LINE: 021
TRUNK DATA:
ANS MODE: MANUAL

FOR LINE ACCESS

A. CONFIGURATION
2. LINE ACCESS
SET: 227
LINE ASSIGNMENT - LINE 021

Call sequence -
1. Caller selects tie-trunk
2. Norstar alerts any sets with the line appearance 021 (station 227)

Answer:

Normal

Programming E&M Trunks (continued)

Incoming E&M trunks may be programmed to be either "Manual Answer" or "Auto Answer" for incoming calls. Manual Answer E&M trunks operate the same as trunks of a DR3 system.

The diagram on the facing page depicts an E&M trunk mapping example, for a manual answer E&M trunk..

Line 021 is programmed in Configuration Programming for the manual answer mode.

Under the heading "2. Line Access" station 227 has been assigned Line 021, the E&M Trunk.

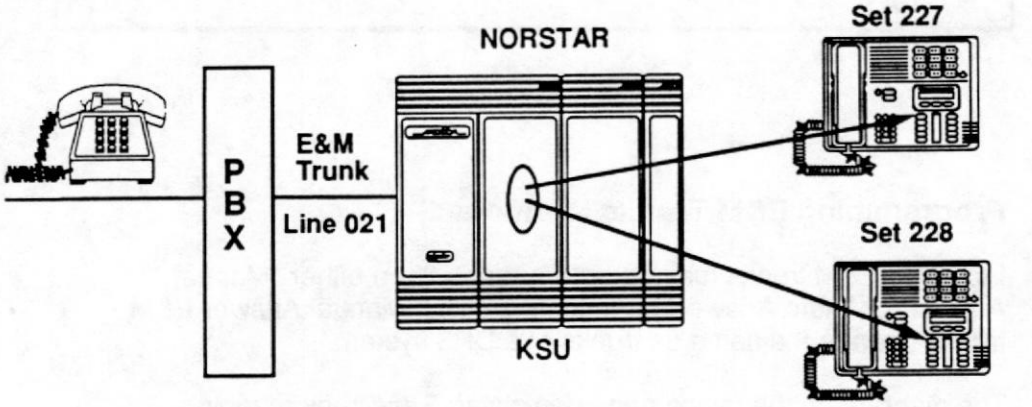
An incoming call from the other end of the E&M trunk will ring directly at station 227. To answer the incoming call, the user at station 227 simply presses the line button associated with line 021.

An outgoing call from the Norstar System may be initiated by selecting the E&M manual answer trunk when it is idle

Question: From the information presented in the diagram, is it possible to have the line appearance of line 021 on more than one Norstar set?

_____

AUTO ANSWER E&M TRUNK



Required Programming

FOR THE PHYSICAL TRUNK	FOR THE TARGET LINE	FOR LINE ACCESS
A. CONFIGURATION 1.TRK/LINE DATA LINE: 021 TRUNK DATA: ANS MODE: AUTO	1.TRK/LINE DATA LINE:081 RECEIVED NIUMBER:234	A. CONFIGURATION 2. LINE ACCESS SET: 227 LINE ASSIGNMENT - LINE 081 SET:228 LINE ASSIGNMENT - LINE 081

Call sequence -
1. Caller selects tie-trunk
2. Norstar auto answers and returns dial tone to the caller
3. Caller enters the digits 234
4. Norstar alerts sets with line appearance 081

Answer:

Yes, an E&M trunk can appear on as many sets as required by the customer.

Programming E&M Trunks (continued)

The diagram on the facing page depicts an E&M trunk mapping example, for an auto-answer E&M trunk..

Line 021 is programmed in Configuration Programming for the auto-answer mode. The "Ans with DISA" option has been set to the parameter of "No".

Target line 081 has been assigned the digit string of 234.

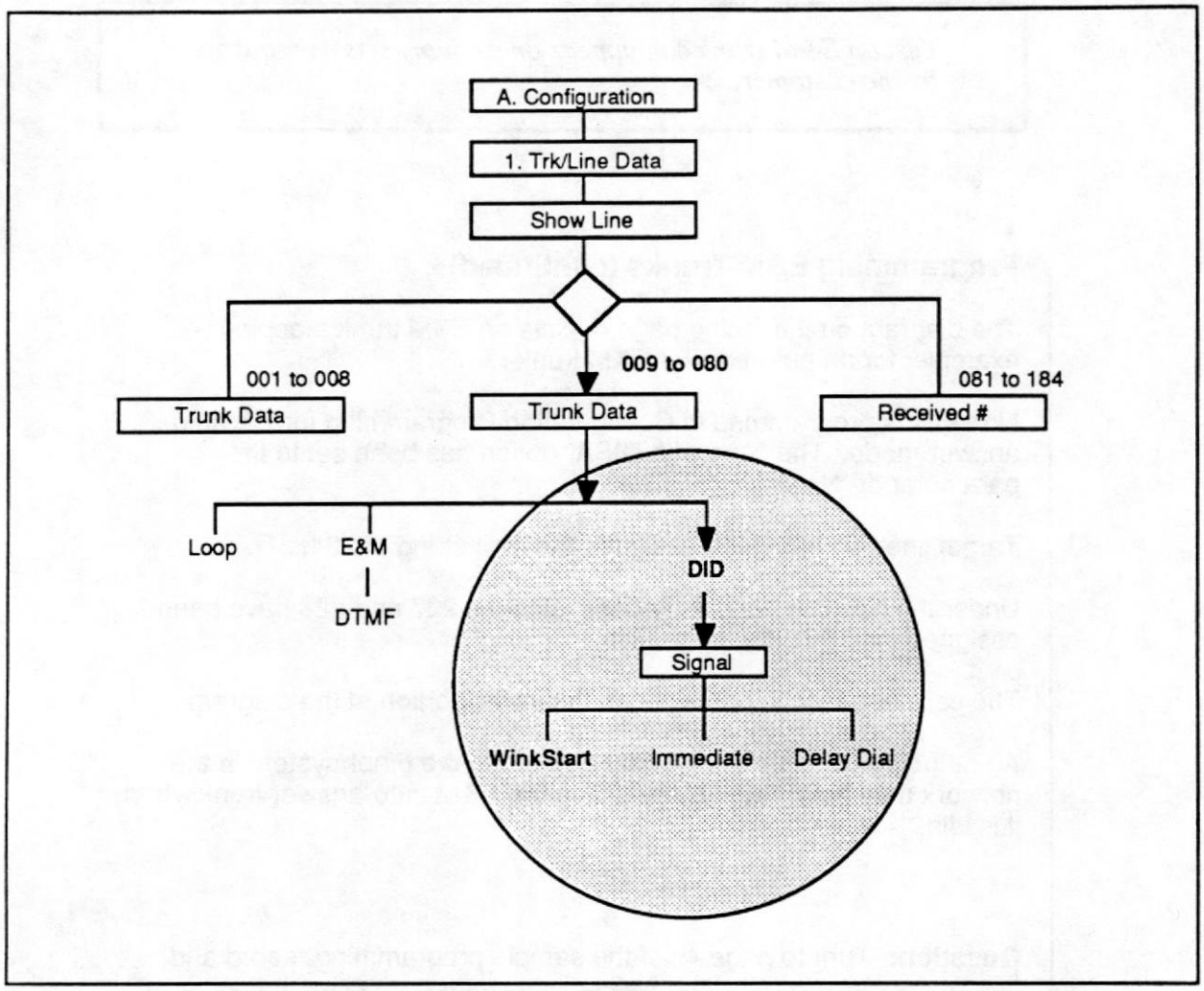
Under the heading "2. Line Access" stations 227 and 228 have been assigned Line 081, the target line.

The call sequence is described in the lower portion of the diagram.

An outgoing call from the Norstar System to the other system in the network may be initiated by selecting the E&M auto-answer trunk when it is idle.

Question: Turn to page 4c of the sample programming record and enter the parameters required to program the E&M trunk feature of your captive system.

DID TRUNK PROGRAMMING CHART



DID Trunk Programming

DID trunks are incoming paths only from the Central Office to the Norstar System. The digits received from the Central Office on a DID trunk are used to route calls to a target line. The DID call appears at every telephone assigned an appearance of that target line.

At the "Trunk Data" level of trunk programming DID is selected. The only parameter which requires programming is "Signal".

The "Signal" type is chosen to match the type of Central Office that is supplying the DID trunks. Three options are available:

- Immediate Start: used with analogue offices
- Wink Start: used with digital offices (most commonly used and therefore is the default value)
- Delay Dial: used when a battery and ground reversal are required.

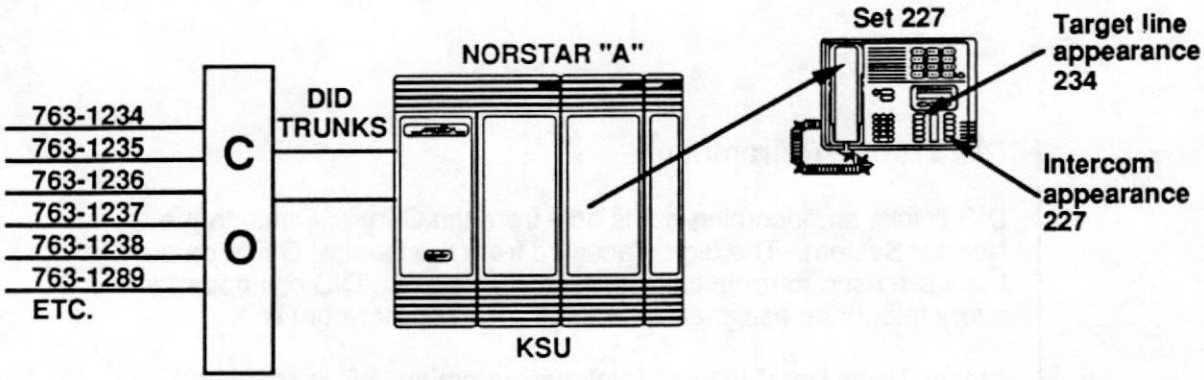
DID trunks **must** be supervised and **must** be auto answer. DR4 software provisions for both of these requirements. You are **not** required to set these parameters in programming.

Question: Answer the following statement as either True or False.

Outgoing calls may be placed from a Norstar DID trunk.

_____

DID TRUNK MAPPING CONCEPT



Required Programming

FOR THE PHYSICAL TRUNK

A. CONFIGURATION
1.TRK/LINE DATA
LINE: 009
TRUNK DATA: DID
SIGNAL:WINKSTART

FOR THE TARGET LINE

A. CONFIGURATION
1. TRK/LINE DATA
LINE: 081
REC'D # :234
2. LINE ACCESS
SET: 227
LINE ASSIGNMENT - LINE 081

Call sequence -
1. Caller dials 763-1234
2. C.O. selects free trunk and sends the digits 234 to the Norstar
3. Norstar software makes a logical match (received #).
4. Norstar alerts any sets with the target line assigned (227).

Answer:

False

DID Trunk Programming (continued)

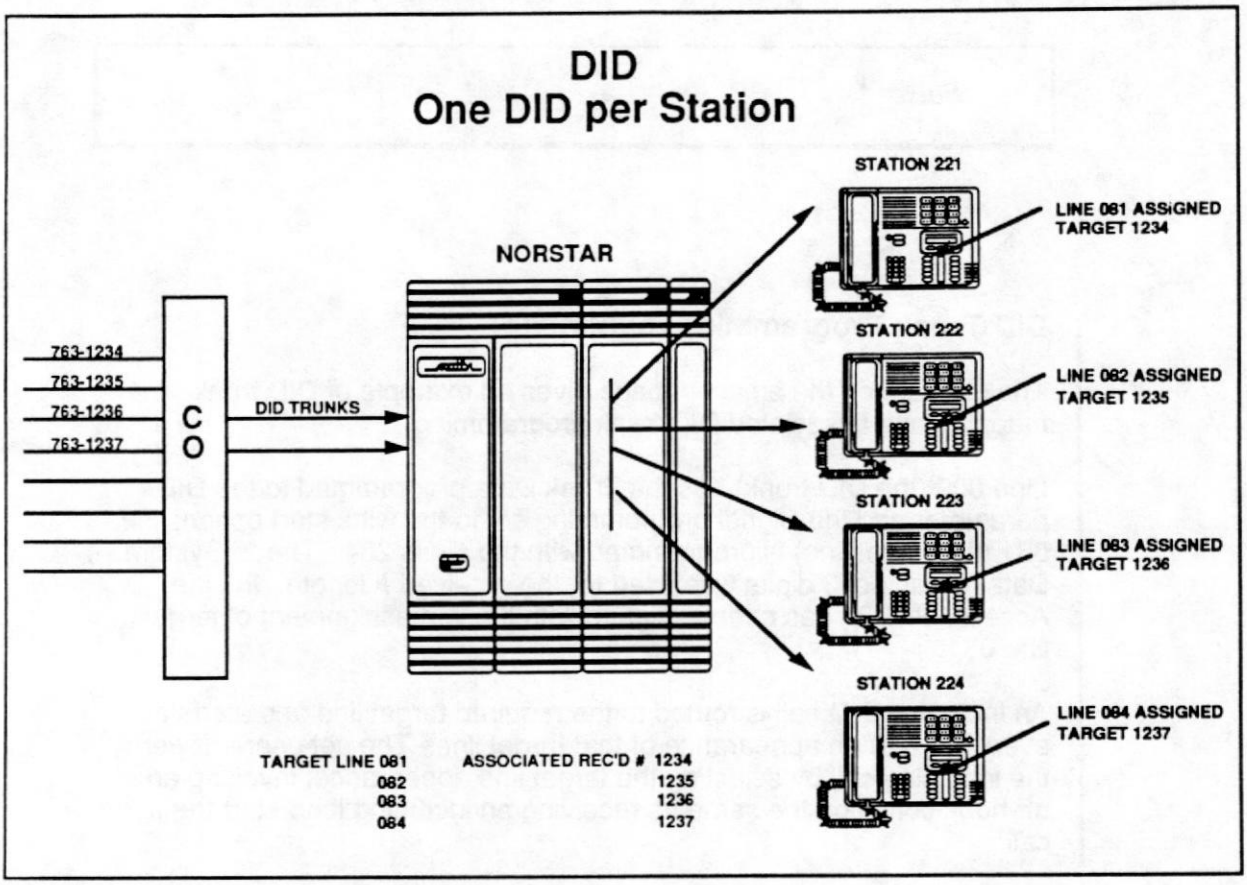
The diagram on the adjacent page gives an example of DID trunk mapping and associated DID trunk programming.

Line 009 (the DID trunk) has the Trunk Data programmed to the DID parameter and the Signal programming set to the wink start option; line 081 (the target line) is programmed with the digits 234. The "5.System Data" default of 3 digits was used for the received # length. In Line Access, set 227 has been assigned with the line assignment of target line 081.

An incoming DID call is routed to the required target line and alerts at every set with an appearance of that target line. The set user answers the incoming call by selecting the target line appearance, invoking an off-hook condition the same as receiving an incoming loop start trunk call.

Question: Answer the following statement as either True or False.
A DID call coming in on trunk line 009 with the digits 238 will ring at set 227.

_____


DID
One DID per Station
NORSTAR
763-1234
763-1235
763-1236
763-1237
C
O
DID TRUNKS
STATION 221
LINE 081 ASSIGNED
TARGET 1234
STATION 222
LINE 082 ASSIGNED
TARGET 1235
STATION 223
LINE 083 ASSIGNED
TARGET 1236
STATION 224
LINE 084 ASSIGNED
TARGET 1237
TARGET LINE 081 ASSOCIATED REC'D # 1234
082 1235
083 1236
084 1237

Answer:

False

DID Trunk Programming (continued)

A Norstar may have the actual appearance of the DID trunk assigned to a line button for monitoring purposes allowing an attendant to determine the idle/busy status of the trunk. This appearance could be in addition to the associated target line appearance.

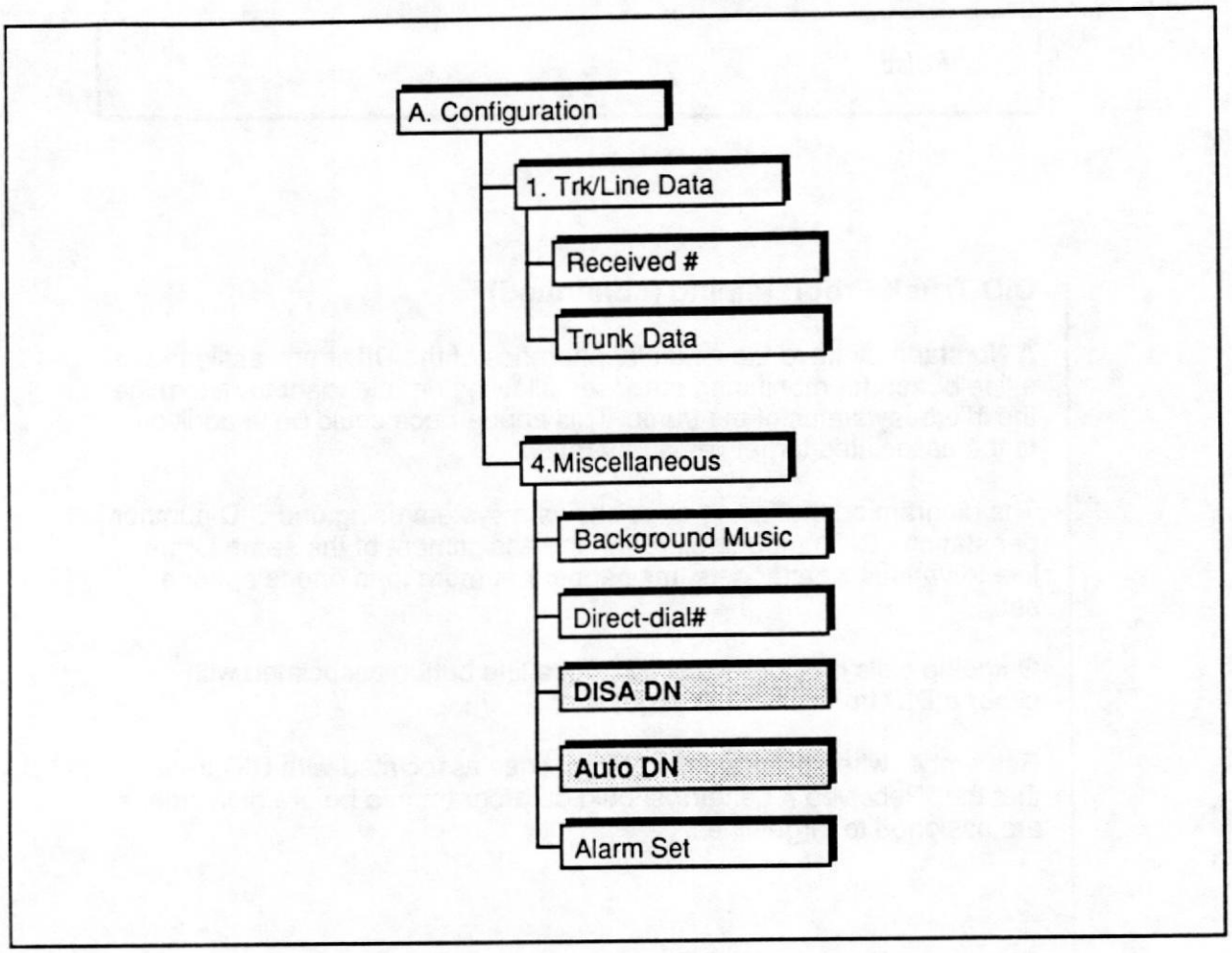
The diagram on the facing page shows a system using one DID number per station. DID numbers, through the assignment of the same target line to various Norstar sets, may appear at more than one telephone set.

Outgoing calls cannot be placed from a line button associated with either a DID trunk or a DID target line.

Remember when programming target lines associated with DID trunks that the "Received # Length" should be programmed before digit strings are assigned to target lines.

Question: Program the DID trunks as shown on page 4d of the sample programming record.

DISA PROGRAMMING CHART



Programming for Remote Access

Norstar provides "Remote Access" on Loop Start, E&M, and DID trunks to allow a remote user to obtain Norstar System dial tone. Once the remote caller has accessed the system, the remote caller may then use the Norstar paging feature, access line pools, or call a target line dependent upon the Class of Service password entered.

Setting the security requirements for remote access callers with Loop Start and E&M trunks is performed by setting the "Ans with DISA" mode within trunk programming, as described earlier in this Unit.

Setting the security requirements for remote access callers with DID trunks involves programming the DISA DN and Auto DN parameters within the "Miscellaneous" heading of the Configuration Level of programming.

DISA DN and Auto DN numbers allow a Norstar System to auto-answer incoming calls, via DID Trunks, either with or without DISA. When an incoming call is mapped onto either the DISA DN or Auto DN, the call is automatically answered as follows:

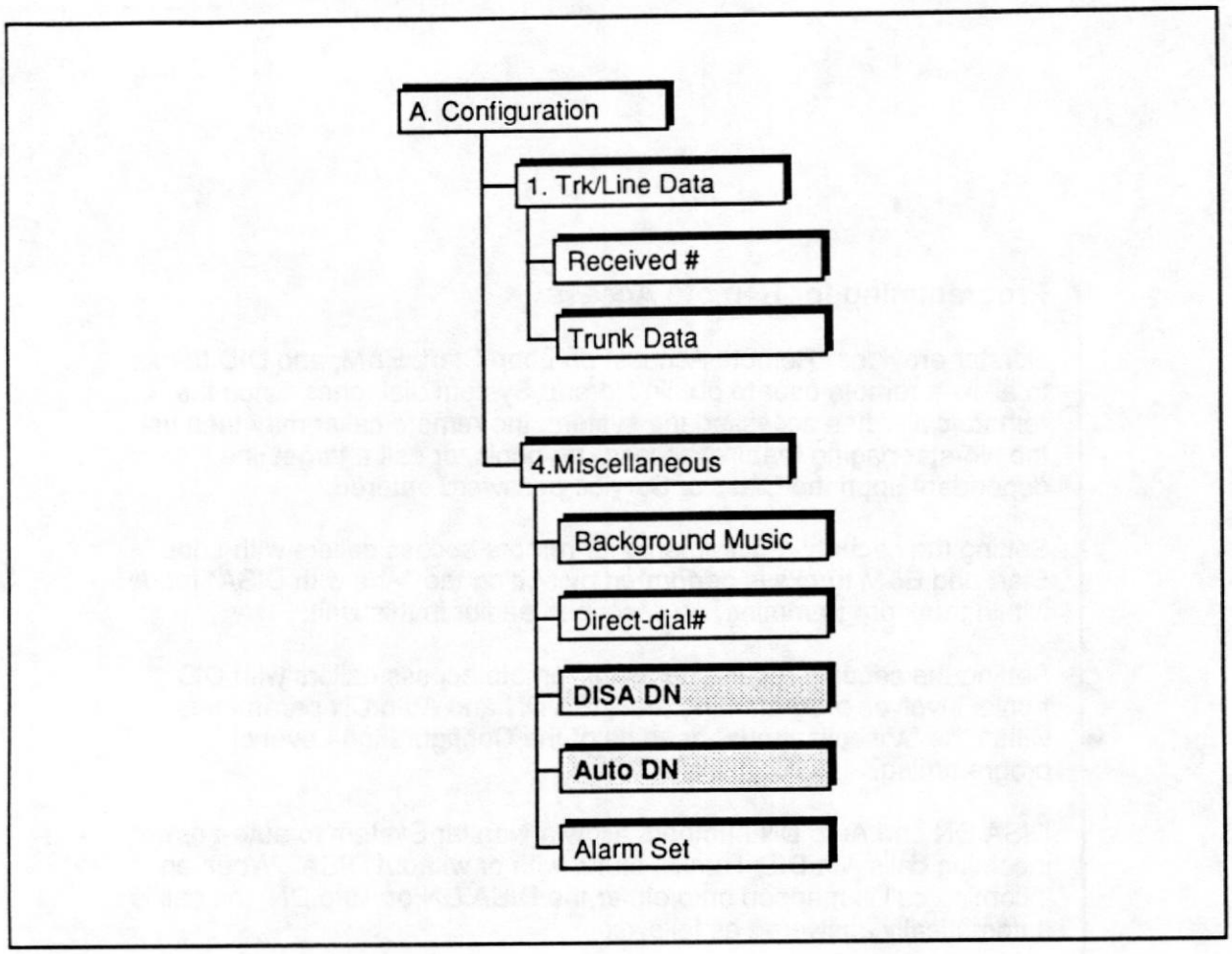
1. DISA DN - The call is answered with DISA and stuttered dial tone is presented to the caller. The caller must enter a COS password to gain access to the system. The Class of Service that applies to the call is determined by the password entered by the user. When a valid COS Password is entered the caller is presented with system dial tone and dialing may commence to allow the caller to proceed with access to the Norstar System's capabilities.

2. Auto DN - The call is answered without DISA and the caller is immediately presented with system dial tone. Dialing may commence as access to the systems capabilities has now been obtained.

Question: Answer the following as either True of False.
When accessing Norstar remotely, the DISA DN provides security access to the Norstar System and the Auto DN provides immediate access to the Norstar System.

_____

DISA PROGRAMMING CHART



Answer:

True

Programming for Remote Access (continued)

When Norstar is part of a public network, any remote caller can dial the Auto-DN digits and access the Norstar System. In these situations, the Auto-DN should be programmed to"None" and a number entered into the DISA DN. Then, when an unauthorized remote caller happens to dial the DISA DN stuttered dial tone will be presented. The remote caller is unable to gain access to the Norstar System until a valid COS password is entered.

For example, a Norstar with DID trunks could have the DID numbers from 763-1234 to 763-1239 with a received number length of 3 digits. Target lines 081 to 084 could be programmed with the digits 234 to 237. The DISA DN programming could consist of entering the digits 238 to make these digits the DISA DN number. Auto DN programming could consist of entering the digits 239 to make these digits the Auto DN number.

When a remote caller inadvertently dials 238, the system will present the caller with stuttered dial tone, therefore restricting access to the system's resources. Authorized users of the system could be given a COS password to allow them access to the Norstar System's resources.

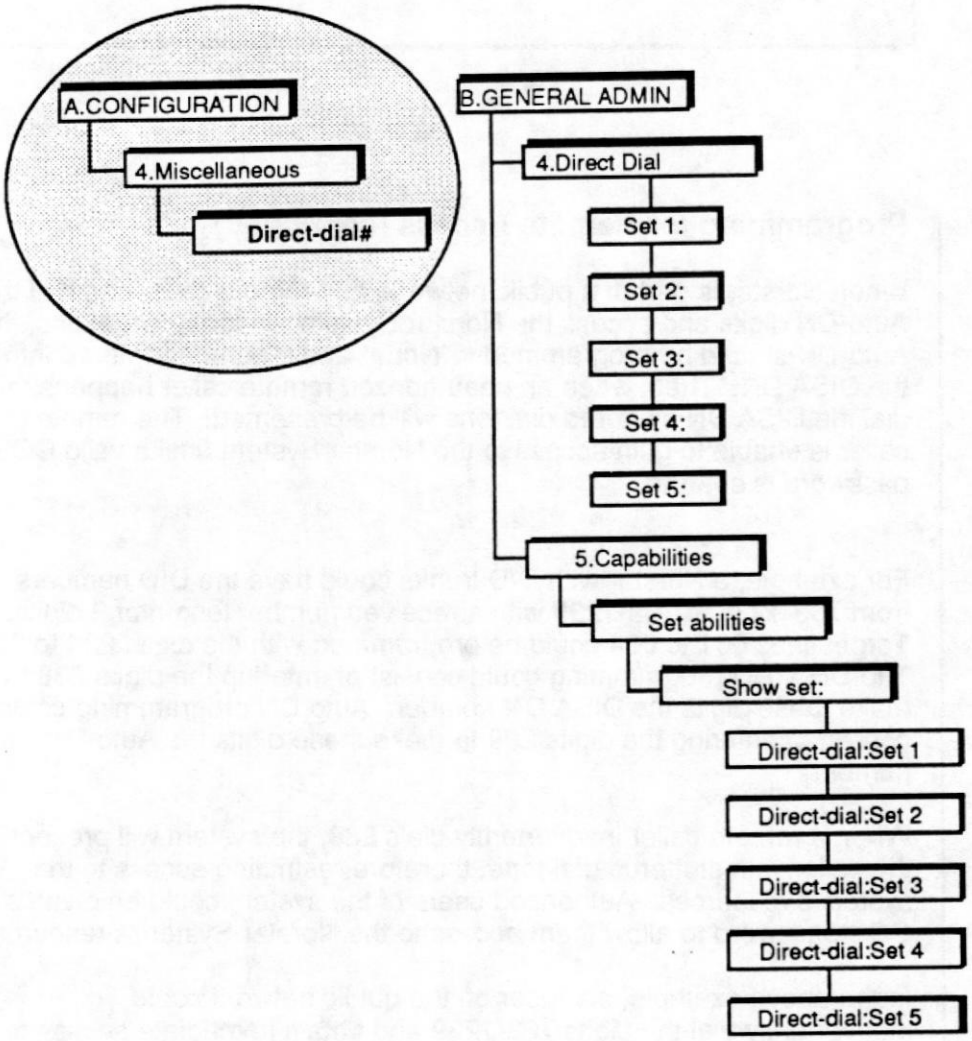
In the above example, any user on the public network could inadvertently dial the digits 763-1239 and obtain immediate access to the Norstar system and its resources. To avoid this possibility, the Auto DN feature should be programmed to "None".

Question: Circle the best answer.

A remote user with authorized access to Norstar can:

a. access all Norstar System features.
b. access line pools, target lines, and remote paging dependent on COS programming.
c. Access remote paging only.

DIRECT DIAL PROGRAMMING CHART



Answer:

b. access line pools, target lines, and remote paging dependent on COS programming.

Direct-dial

The Direct Dial feature of DR4 is an enhancement of the Dial-0 feature of DR3. This feature allows a set user to dial a single digit from an intercom number to call a specific set, called a Direct Dial Set. DR4 software supports multiple (up to 5) direct dial sets so that different sets may call different direct dial sets when the same single digit is dialled on the intercom.

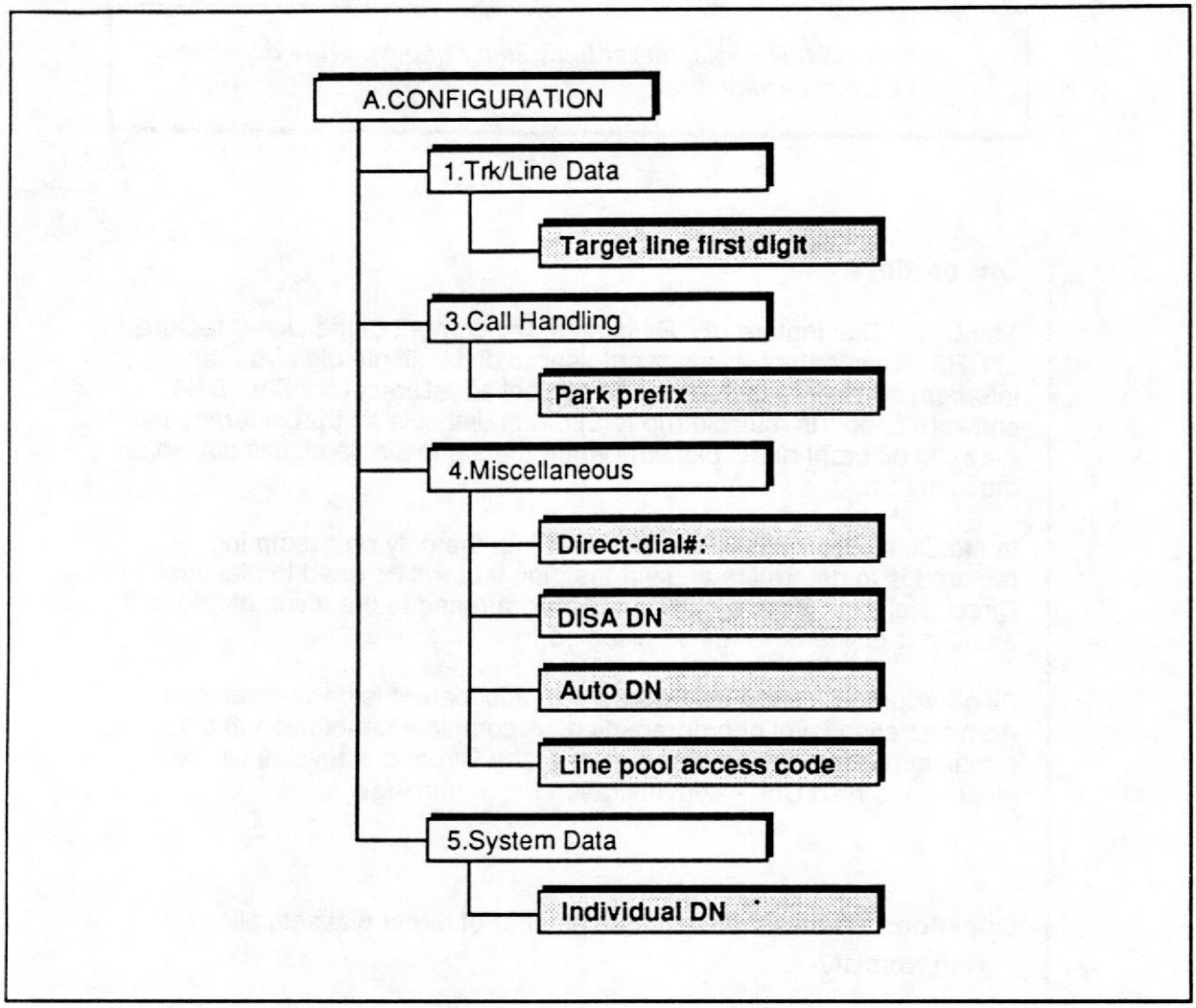
In the Configuration level of programming, the only programming required is to determine and set the digit that will be used to dial the Direct Dial Set. If the parameter is programmed to the value of "None", the Direct-dial feature will be disabled.

All other programming associated with this feature is performed in the Administration level of programming. A complete description and the remaining programming parameters of the Direct-dial feature will be given in the next Unit - Administration Programming.

Question: What is the maximum number of direct-dial sets allowed with Norstar?

_____

NUMBERING PLAN CHART



Answer:

5.

Norstar Numbering Plan

A numbering plan as defined for use with Norstar refers to the digits dialed by the user to access Norstar telephone sets. The dialed digits referred to are the internal or intercom numbers.

All intercom numbers must have the same number of digits. To match the numbering plan of a PBX, the Norstar DN length may be changed to a maximum number length of seven digits.

Line pool access codes can be from one to four digits in length; however, if they start with the same digit they must be the same length. For example, a line pool access code of 71 cannot co-exist with a line pool access code of 7, both must be two digits in length. Line pool access codes cannot conflict with:

- the first digit of any Individual DN (intercom number).
- the first digit of the DISA DN or Auto DN.
- the first digit of any digit string assigned to a target line.
- the Call Park prefix.
- the Direct-Dial digit.

Symbols such as * and # cannot be used in intercom numbers or line pool access codes.

Question: Digits assigned to the various features are all defined in the _____ level of programming.

NOTES

Answer:

A.Configuration

Summary

The following information is provided as a summary and also as a reference for programming different target line and trunk applications.

Target Lines

1. The "Rec'd # length" should be specified in 5.System Data programming before digit strings are assigned to the target lines.
2. Target lines are programmed as Lines 081 to 184.
3. If possible, target line digits strings should match the digits of the Norstar intercom number when Loop Start or E&M trunks are configured for auto answer.
4. When DID trunks are connected to Norstar, the target lines **must** be programmed to match the digits being sent to Norstar by the Central Office.

Trunks

1. The KSU only supports Loop Start Trunks and are programmed as Lines 001 to 008.
2. Trunks connected through trunk modules are programmed as Lines 009 to 080.
3. All auto answer Loop Start trunks must be programmed for disconnect supervision. DID trunks are configured within DR4 for disconnect supervision; no programming is required.

NOTES

Summary (continued)

Loop Start Trunks

1. Loop start trunks may be programmed to answer calls either manually or automatically.

2. Trunks programmed for manual answer behave as normal trunks connected to a DR3 system. Loop start trunks placed in line pools for outgoing service are generally programmed for manual answer.

3. Auto-Answer loop start trunks may be programmed to answer with or without DISA. DISA is used to provide security access to the Norstar system, for remote access.

   When configured to answer without DISA, system dial tone is presented to the incoming caller; no system security is required. The caller may then enter the digits assigned to a target line, dial the access code of a line pool, or enter the characters and digits associated with the Norstar paging feature.

   When configured to answer with DISA, stuttered dial tone is presented to the caller; system security is required. The caller is prevented from accessing Norstar's resources until a COS (Class Of Service) password is entered. When a valid COS password is entered, the system will then present the caller with system dial tone. Once access has been gained to the system (system dial tone is received) the caller may then enter the digits assigned to a target line, dial the access code of a line pool, or enter the characters and digits associated with the Norstar paging feature.

NOTES

Summary (continued)

E&M Trunks

1. E&M trunks may manually or automatically answer calls dependent on programming. Call treatment options pertaining to DISA are the same as loop start trunks.

2. The "Signal" setting is programmed to match Norstar to the type of switch that the E&M tie-line is connected to.

3. "Gain" is programmed to control the transmission levels of the tie-trunk circuit.

DID Trunks

1. DID trunks require Disconnect Supervision and Auto-Answer. As DR4 provisions for these two requirements, no additional programming is necessary to enable these requirements.

2. When DID trunks are used, the digits assigned to the target lines must match the digits being received from the Central Office.

NOTES

Review Work Exercise

Follow the steps listed below and enter the Configuration Programming information into your captive system. **Do Not** program the Administration Programming section of the programming record. Administration programming will be performed in the next unit, Unit - 3b.

1. Beginning on page 4a of the sample programming record, ensure that the programming that you previously entered is correct. Enter any values that may have been overlooked.

2. Program all remaining parameters associated with Configuration Programming as shown in the sample programming record.

3. After you have completed the programming, ensure that you are at the main heading Administration in preparation for the next Unit.

NOTES

UNIT 3b - ADMINISTRATION PROGRAMMING

Programming features and parameters associated with Administration Programming of DR4 software is performed in the same manner as programming other versions of Modular software. The following access code is pressed on the buttons of either an M7310 or M7324 Norstar telephone set to enter into the Administration programming mode:

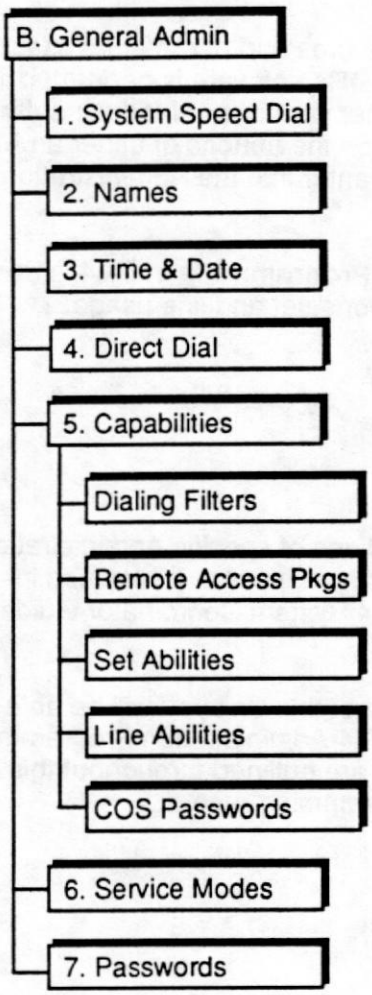
Administration Programming of DR4 is used to change settings relating to telephone set and line usage.

Press ∫••Å
∫••

Detailed descriptions of specific Administration features and programming instructions may be located in either the DR4 Installer Guide or the DR4 System Coordinator Guide.

Upon completion of this Unit you will be able to enter and change values within Norstar DR4 Administration Programming. The values that you will be changing are outlined throughout this Unit and are contained in the sample programming record.

Norstar DR4
Administration Programming



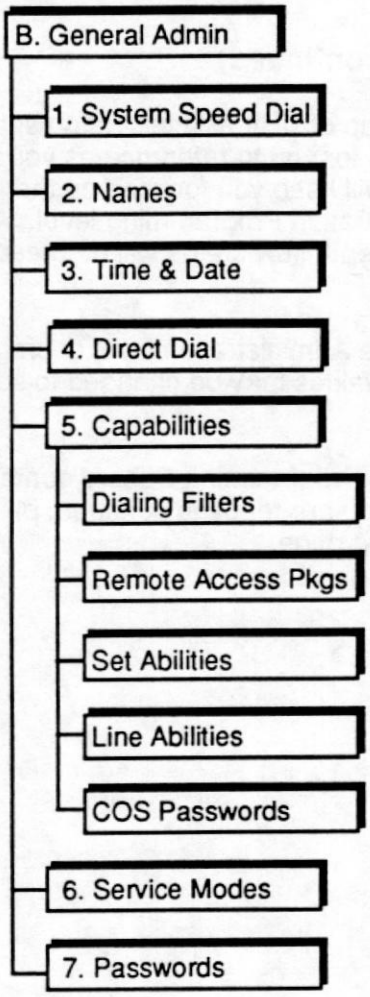
Programming (continued)

A programming map of DR4 Administration software has been provided on the facing page for you to reference as you work through this Unit. This overall map will keep you focused on the location of the features within the Administration Programming level. As you proceed through this Unit, more indepth flow charts will be presented.

Once access to the Administration level of programming has been achieved, default values may be changed to suit specific customer requirements.

Locate the sample Programming Record contained with your training package. When you are ready to continue, please begin reading the material on the next page.

Norstar DR4
Administration Programming



DR4 Programming Record

The DR4 Programming Record is much the same in format as the DR2 and DR3 Programming Records. Some of the sub-headings have been changed to reflect a new or enhanced programmable feature. For example, the "4.Restrictions" and "5.Overrides" sub-headings have been combined into a new sub-heading called "Dialing filters".

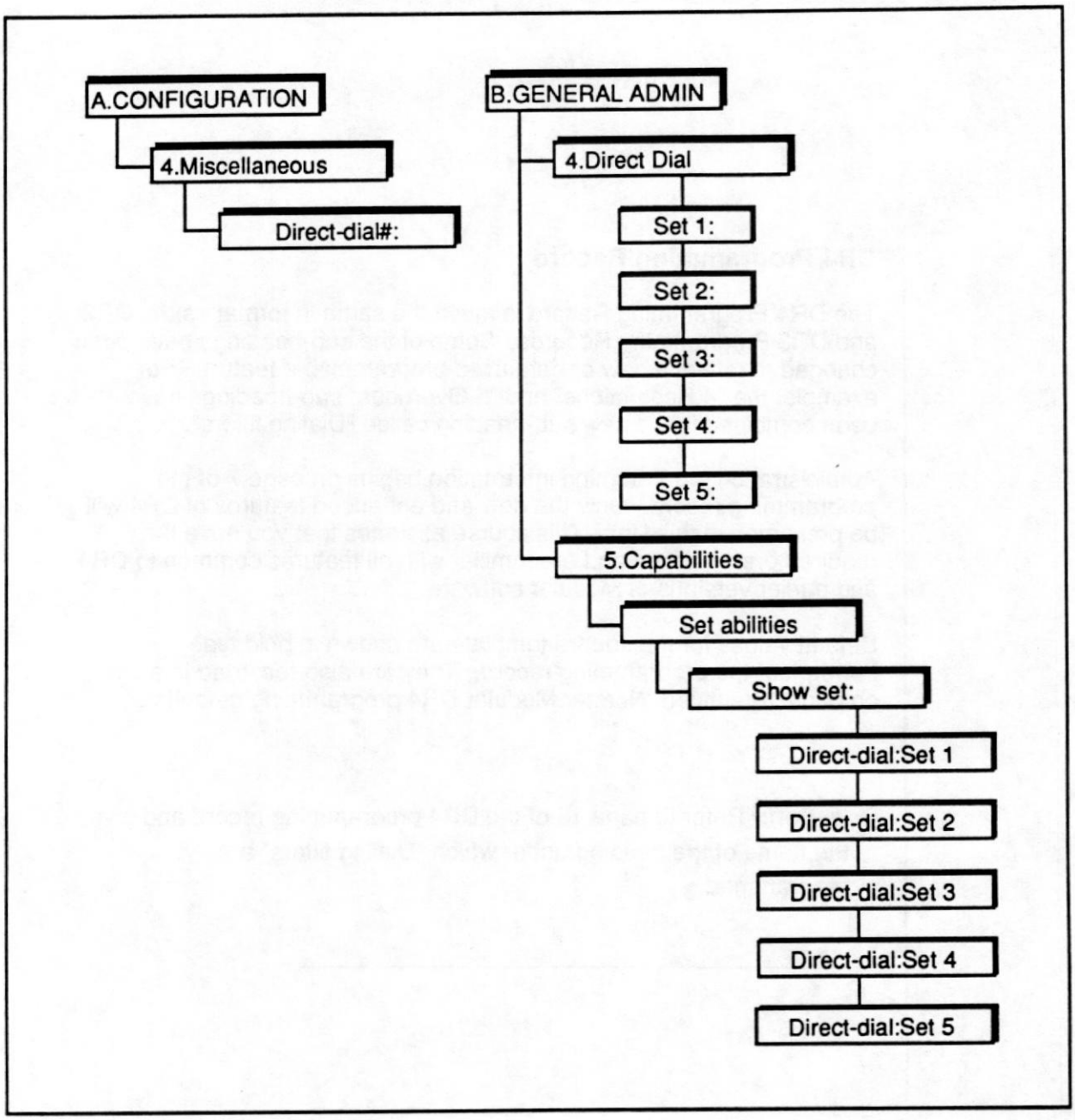
Administration programming information begins on page 7 of the programming record. Only the new and enhanced features of DR4 will be presented in this Unit. This course assumes that you have the required prerequisites and are familiar with all features common to DR4 and earlier versions of Modular software.

Default values for the square template are shown in bold type throughout the programming record. They are also recorded in a chart on page 16 entitled "Norstar Modular DR4 programming defaults".

Question: Refer to page 16 of the DR4 programming record and give the name of the heading under which "Dialing filters" are programmed.

_____

DIRECT DIAL PROGRAMMING CHART



Answer:

> *5.Capabilities replaces the Permissions heading of previous versions of Modular software.*

Direct Dial

The Direct Dial feature of DR4 is an enhancement of the Dial-0 feature of DR3. This feature allows a set user to dial a single digit from an intercom number to call a specific set, called a Direct Dial Set. DR4 software supports multiple (up to 5) direct dial sets so that different sets may call different direct dial sets when the same single digit is dialled.

For example, a Norstar System has a total of 20 sets with intercom numbers from 221 to 240. The sets are placed throughout the building as outlined below. There are three main areas which take calls for other sets.

Intercom Numbers Chart	Office Area	Sales Area	Executive Area
Reception	221		
Secretary 1		222	
Secretary 2			223
Clerks	224 to 231		
Salesmen		232 to 237	
Executives			238 to 240

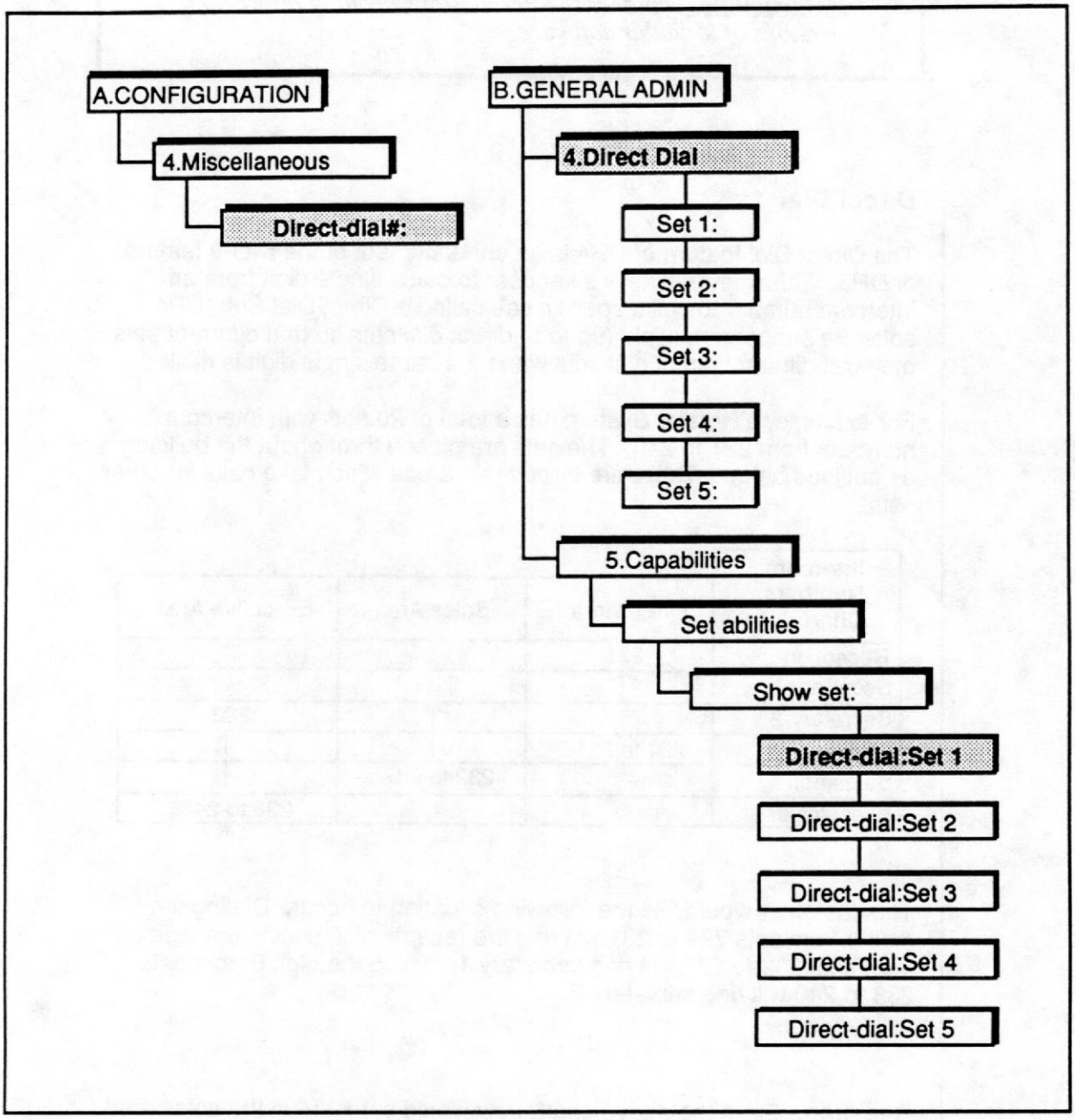
The customer would like the following situation to occur. Dialing the digit 0 from sets 224 to 231 will ring the receptionist; dialing the digit 0 from sets 232 to 237 will ring secretary 1; dialing the digit 0 from sets 238 to 240 will ring secretary 2.

Question: From the above chart, how would set #234 in the sales area place an internal call to the receptionist at set #221 in the office area?

_____

_____

DIRECT DIAL PROGRAMMING CHART



Answer:

Set 234 would dial the digits 221 on the intercom.

Direct Dial (continued)

Programming for this example requires the following parameters to be set.

1. In the Configuration level of programming, under the heading "4.Miscellaneous" the "Direct-dial #" is programmed to be a '0'. If the value of "None" is chosen, the feature will be disabled. (Configuration Programming is generally performed by Installation & Maintenance personnel).

2. In the General Administration level of programming, under the heading "4.Direct-Dial"; set 1 is assigned the intercom number 221, set 2 is assigned the intercom number 222, set 3 is assigned the intercom number 223,

3. In the General Administration level of programming, under the heading "5.Capabilities", the "Set abilities" sub-heading "Direct-dial" is programmed to match the requirements of each set individually. In this area, set 240 would be assigned set 3 as the Direct-dial set.

Question: Referring to the above example, list the headings associated with assigning set 221 as the Direct Dial set for station 227. (Step 3 above)

_____

_____

_____

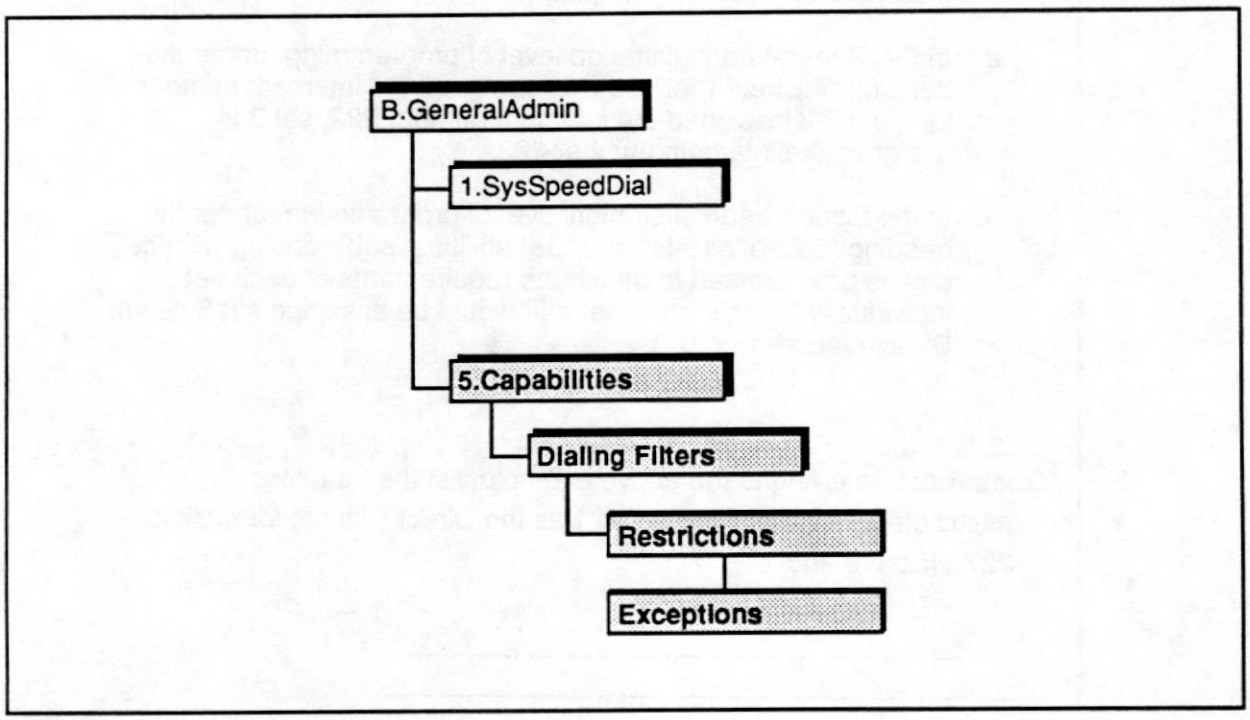
_____

_____

Answer:

5.Capabilities
Set abilities
Show set:227
Direct-dial:Set 1

DIALING FILTER PROGRAMMING CHART



Programming Dialing Filters

DR4 introduces a different method of providing dialing restrictions and restriction overrides through the implementation of Dialing Filters.

Historically, such as with DR3, Norstar provided two separate restriction and override tables to prohibit outgoing calls from accessing toll facilities. DR4 replaces the separate tables with a dialing filter.

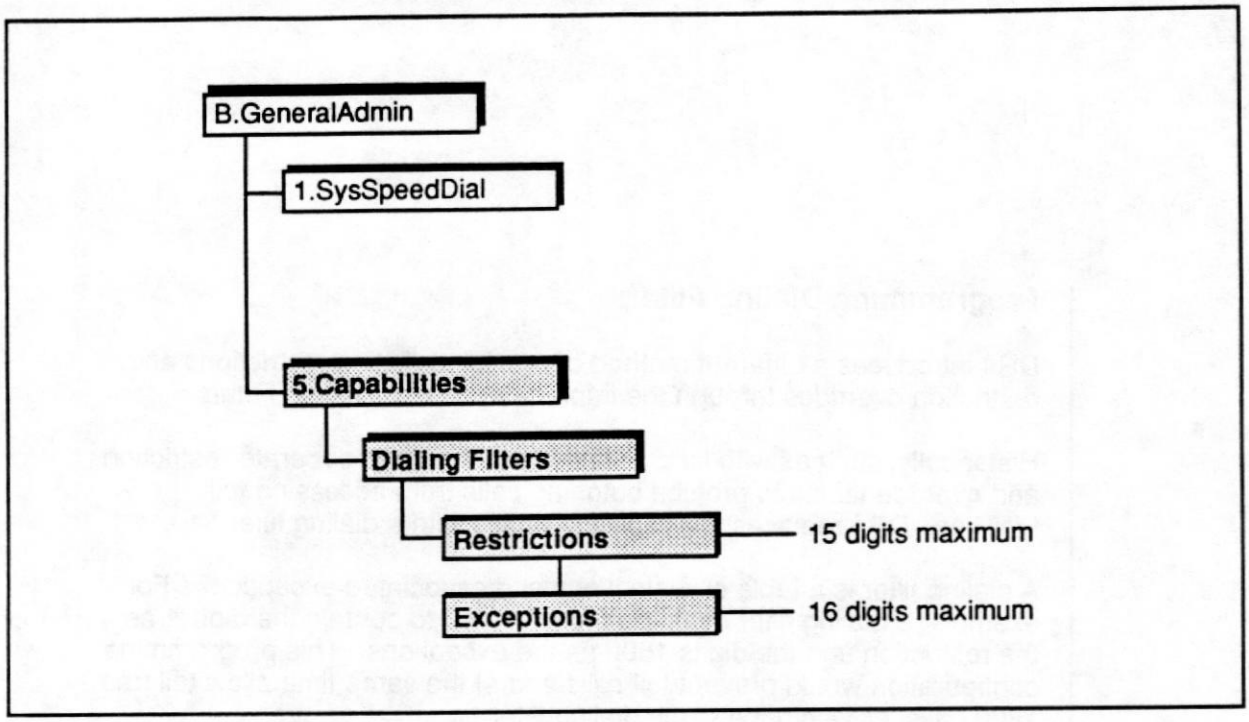
A dialing filter is a table of restrictions and associated exceptions. For example, a dialing filter could be programmed to contain the digit '1 as the restriction and the digits 1800 as the exceptions. This programming configuration would prevent toll calls and at the same time allow toll free 1800 calls, all within the same dialing filter.

Dialing filters can be assigned in various areas of programming to provide levels of service and to restrict levels of service. They may be applied to lines, sets, a line on a set, or a Class of Service password.

Question: Fill in the blanks.

A dialing filter is made up of _____ and _____ .

DIALING FILTER PROGRAMMING CHART



Answer:

restrictions and associated exceptions.

Programming Dialing Filters (continued)

Building dialing filter tables is accomplished in General Administration programming under the heading "5.Capabilities". A maximum of 100 filters (numbered from 00 to 99) may be programmed to accept up to 400 entries. Entries are considered to be restrictions and exceptions.

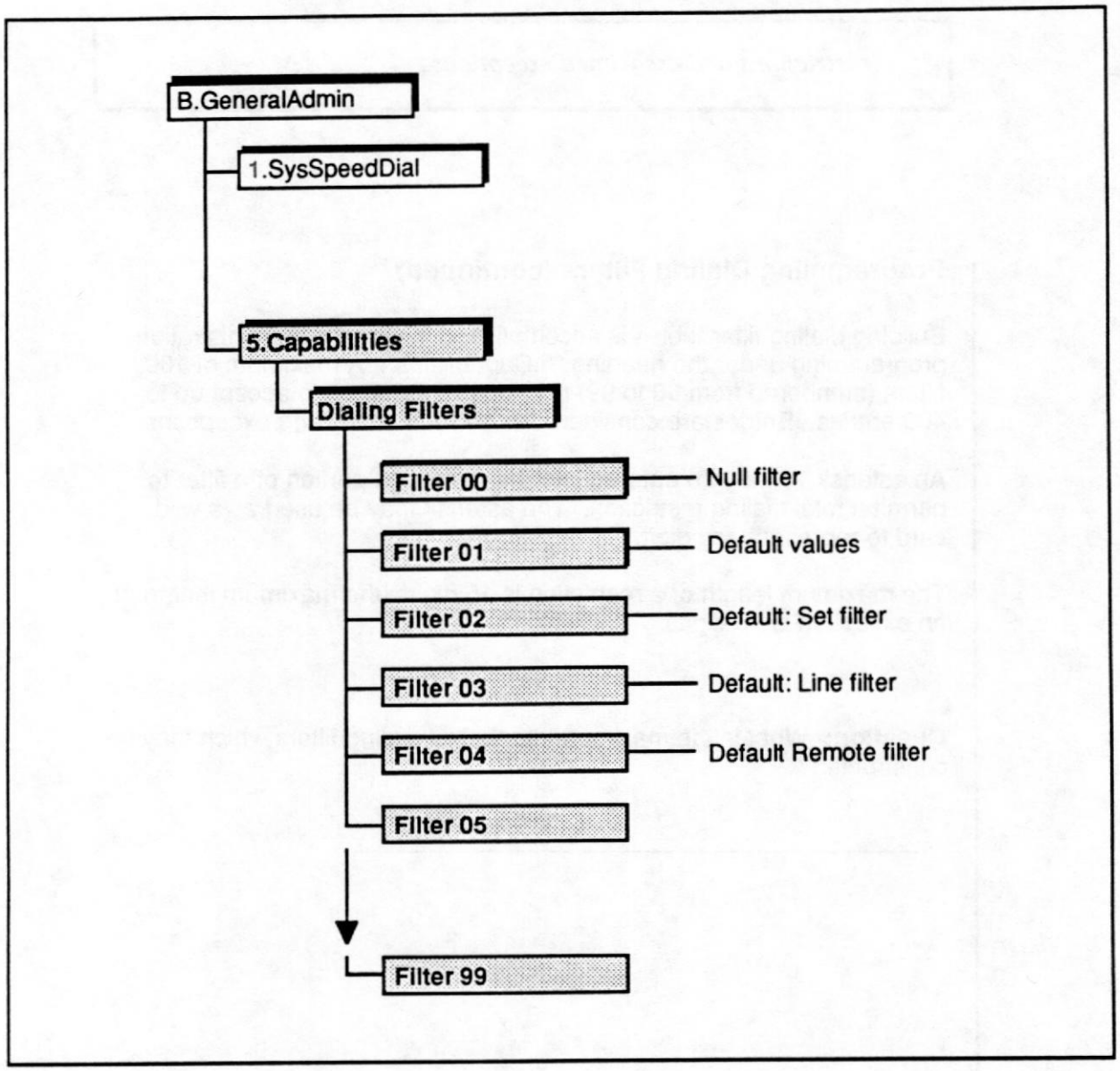
An asterisk "*" may be entered into the restriction portion of a filter to permit a total dialing restriction. The asterisk may be used as a wild card to represent any digit.

The maximum length of a restriction is 15 digits; the maximum length of an exception is 16 digits.

Question: What is the maximum number of dialing filters which may be constructed?

_____

DIALING FILTER PROGRAMMING CHART



Answer:

100

Programming Dialing Filters (continued)

The following list identifies the defaults and special considerations involved with building and assigning dialing filters.

Filter 00 is a "Null" filter permitting unrestricted dialing. The contents of this filter cannot be changed.

Filters 01 to 99 may have up to 48 restrictions each plus any number of exceptions until the system-wide limit of 400 entries is met.

Filter 01: has restrictions and exceptions assigned in default as outlined on page 16 of the programming record.

In default, filters 02, 03 and 04 do not have any restrictions or exceptions entered; however, they are assigned as default values as indicated below:

- Filter 02: is the default filter assigned to sets.
- Filter 03: is the default filter assigned to lines.
- Filter 04: is the default filter assigned as a remote access line filter.

Any digits entered into either the restriction or exception portion of Filters 02, will affect all sets in the system.

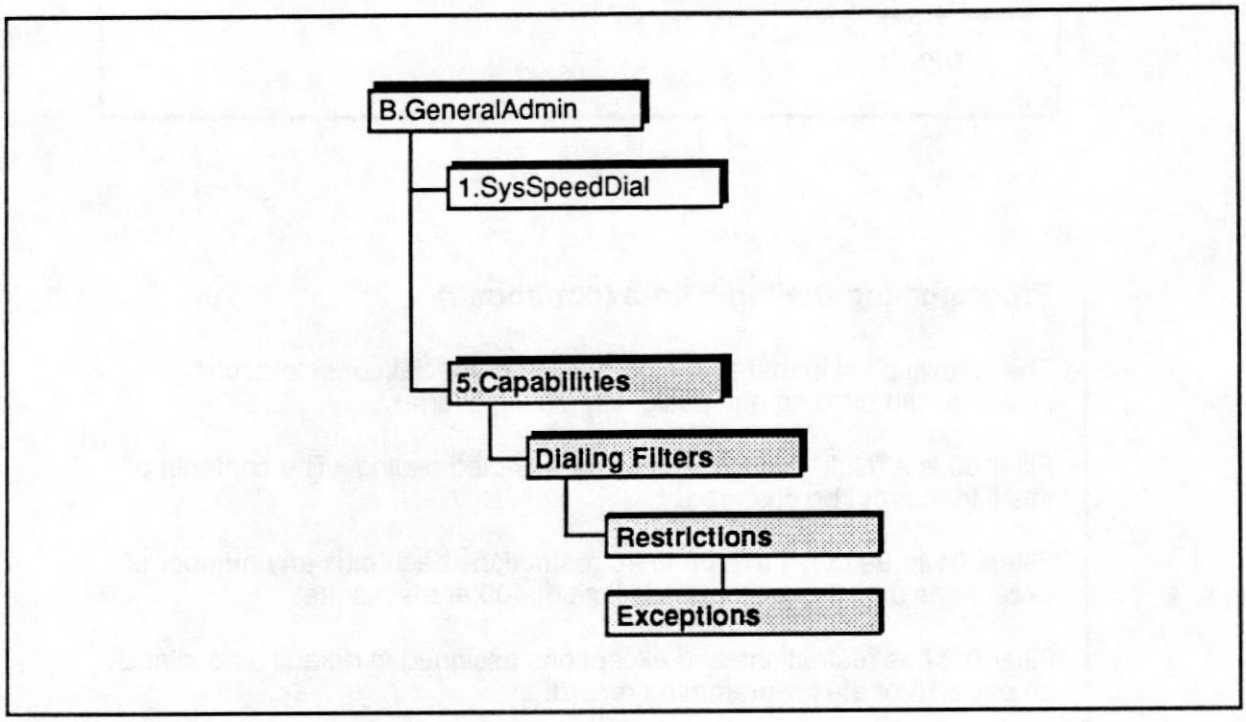
Any digits entered into either the restriction or exception portion of Filters 03, will affect all lines in the system.

Any digits entered into either the restriction or exception portion of Filters 04, will affect all incoming calls to the system.

Question: Which filter would you assign to station 234 to permit unrestricted dialing to all area codes?

_____

DIALING FILTER PROGRAMMING CHART



Answer:

Filter 00

Programming Dialing Filters (continued)

Please turn to page 9 of the sample programming record. Examples of restrictions and exceptions for dialing filter 05 are shown.

As shown on page 9, filter 05 has two restrictions; 01 and 02. Restriction 01 when applied prohibits 1+ dialing and restriction 02 prohibits 0+ dialing. Associated with restriction 01 are two exceptions. All 1+ dialed calls will be prohibited except to directory numbers within 1-819 and 1-514 areas. Associated with restriction 02 are three exceptions. In this portion 0-819, 0-514, and 0-604 calls are allowed.

As a review, filter 01 restricts outgoing calls starting with the digits 1 and/or 0. Calls to the specific areas of 819 and 514 are allowed. Operator assisted calls to area 604 are also possible.

Exceptions **must** begin with the same digit as the restriction. If a restriction begins with the digit '1' then the associated exception must also begin with the digit '1'.

Question: Ensure that you complete both parts, 1 and 2, of the following work exercise.

1. Enter the information below on page 9 of the programming record. Use filter 06 and 07 as the next available filters to program.

   A customer would like all calls to remain with the local calling area. The executives of the company are required to place toll calls to areas with the prefixes 403 and 212. The purchasing department is required to place toll calls to area 212 only.

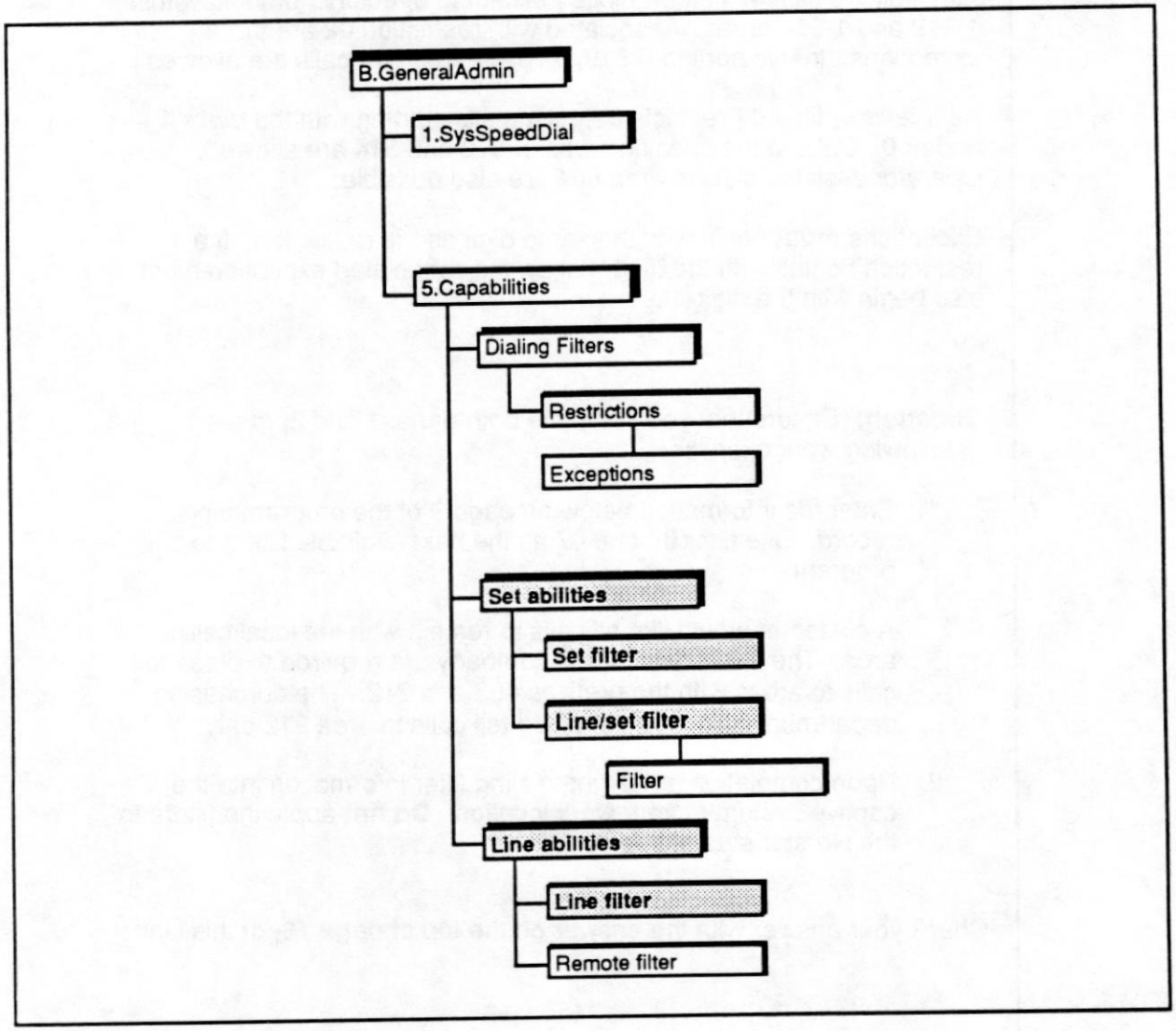
2. Upon completion, **enter** the dialing filter information into the captive system at your work location. **Do not** apply the filters to the Norstar sets at this time.

Check your answer with the answer on the top of **page 18**, of this Unit.

Answer:

Filter	*Restrictions*	*Exceptions*
06	*01 - 1*	*001 - 1403*
		002 - 1212
	02 -0	*001 - 0403*
		002 - 0212
07	*01 - 1*	*001 - 1212*
	02 - 0	*001 - 0212*

DIALING FILTER PROGRAMMING CHART



Programming Dialing Filters (continued)

After the dialing filter tables have been defined , the dialing filters are then assigned to the desired telephone set, line, line on a set, or Class of Service.

When dialing filters are assigned to perform a specific function they are referred to as a reference of that function.

- A dialing filter assigned to a set it is referred to as a "Set Filter".
- A dialing filter assigned to a line it is referred to as a "Line Filter".
- A dialing filter assigned to a line of a set it is referred to as a "Line/Set Filter".

Only one filter can be assigned to a set, line, or a line on a set at a time.

Note: Assigning dialing filters to a Class Of Service password will be explained in detail later in the course. Dialing filters are only one element of the COS password.

Question: List the programmable features that dialing filters may be assigned to:

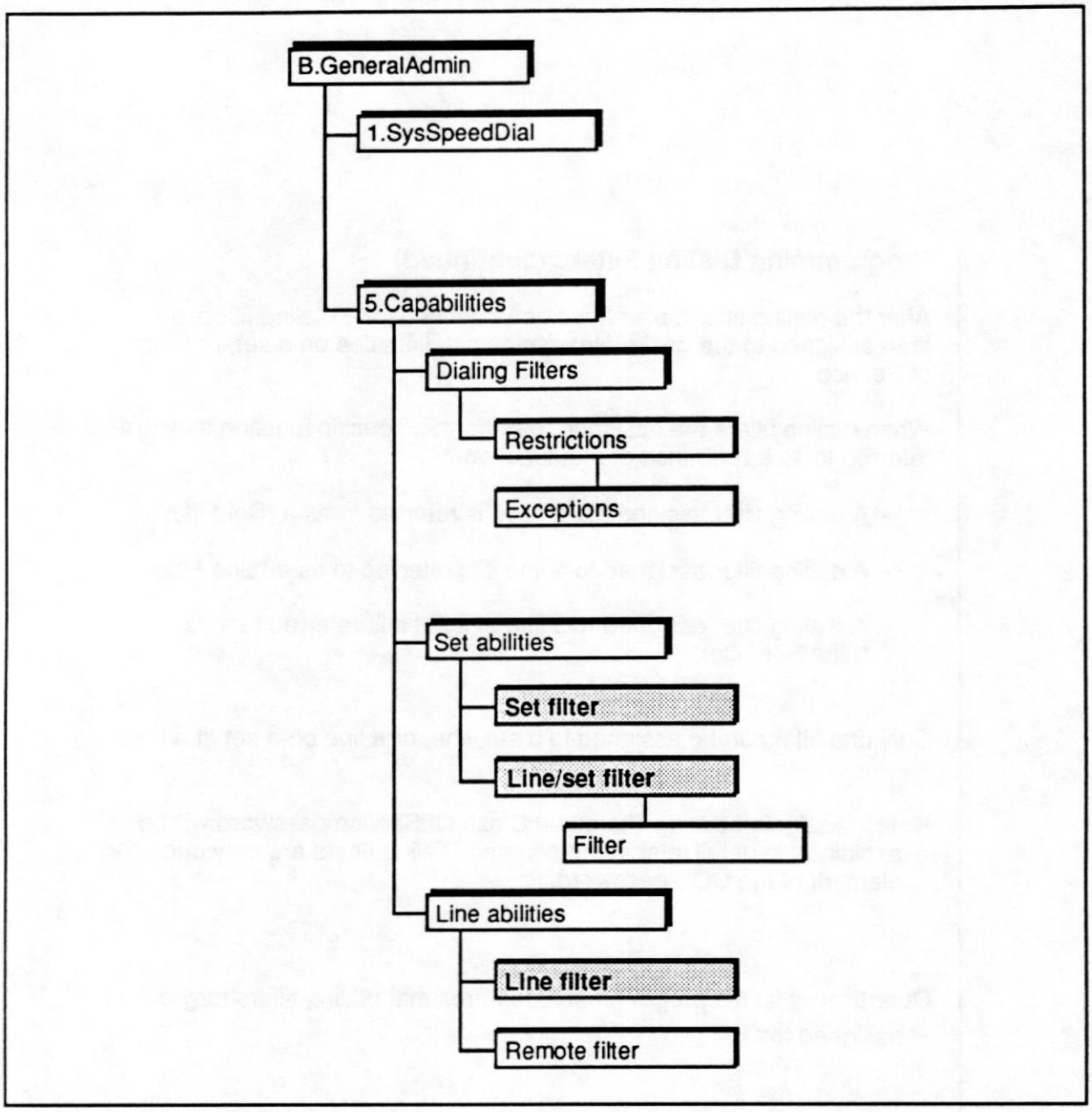
_____

_____

_____

_____

DIALING FILTER PROGRAMMING CHART



Answer:

Sets
Lines
Line on a set
Class Of Service Passwords

Programming Dialing Filters (continued)

Set Filters

Set filters are assigned to the sets under the heading "Set abilities". Page 11 of the sample programming record depicts a typical programming example. Station 223 has been assigned set filter 05.

Line filters

Line filters are applied to lines under the heading "Line abilities" as shown on page 12 of the sample programming record.

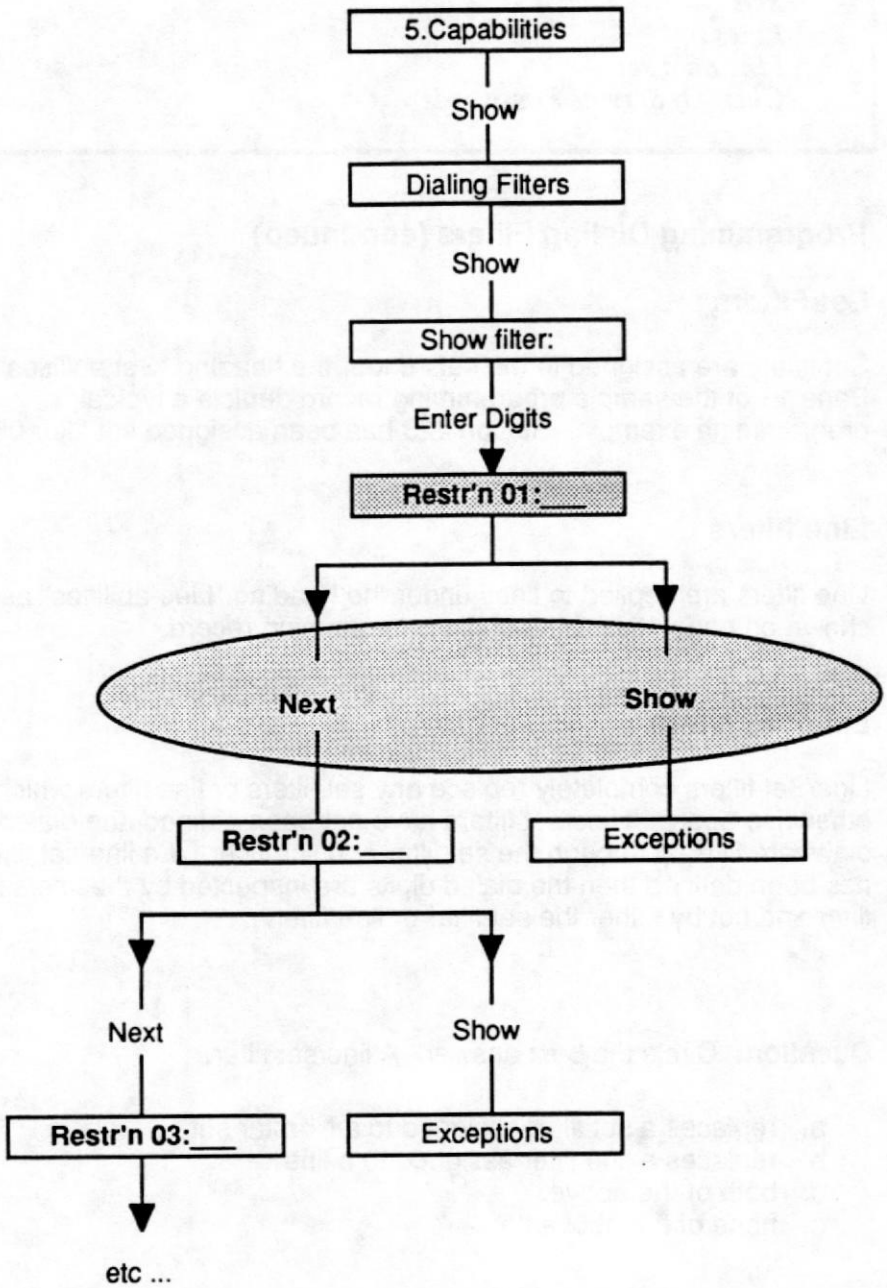
Line/Set filters

Line/Set filters completely replace any set filters or line filters which otherwise apply. If line/set filters have not been defined, the dialed digits are filtered through the set filter and line filter. If a line/set filter has been defined then the dialed digits are inspected by the line/set filter and not by either the set filter or line filter.

Question: Circle the best answer. A line/set filter:

a. replaces a set filter assigned to a Norstar set.
b. replaces a line filter assigned to a line.
c. both of the above.
d. none of the above.

DIALING FILTER PROGRAMMING CHART



Answer:

c. both of the above.

Programming Dialing Filters (continued)

The flow chart on the facing page shows the steps required when entering values into dialing filters.

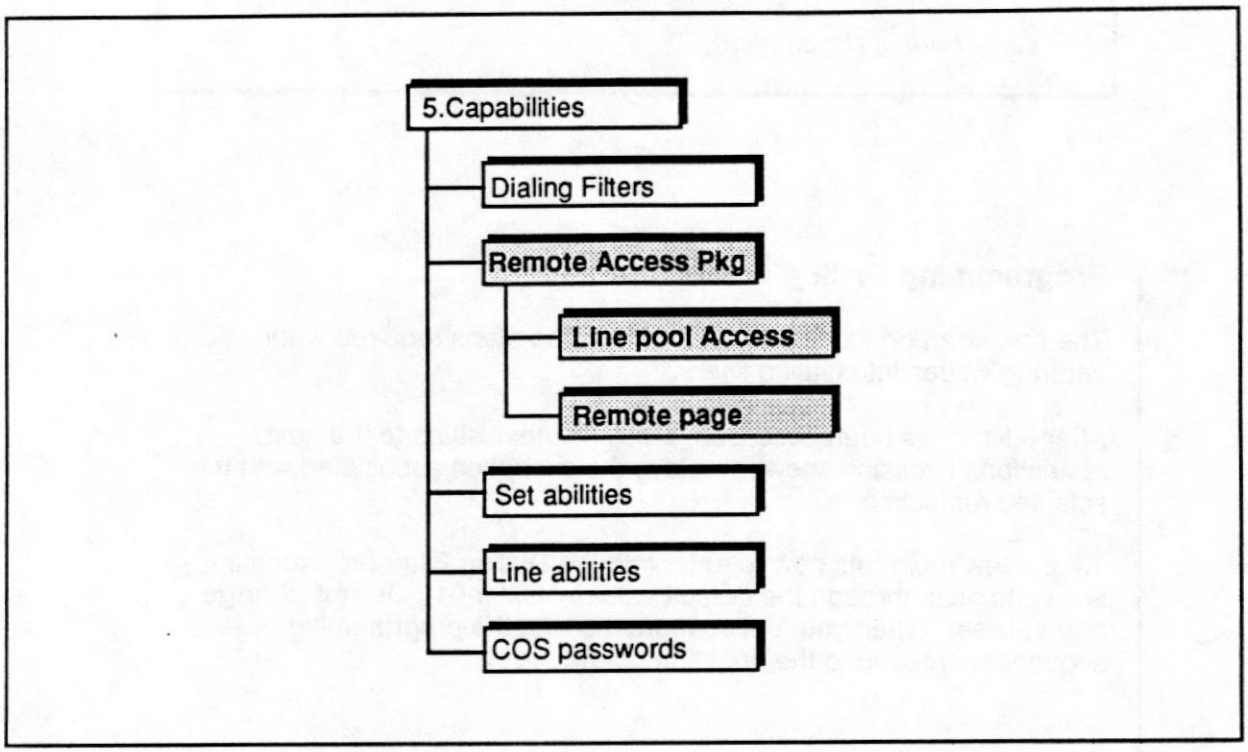
After a filter has been accessed, pressing 'next' steps to the next restriction. Pressing show', displays the exception associated with the selected restriction.

Take a few moments now to enter into the Dialing Filter programming level and scan through the default values of filter 01. **Do not change any values.** When you feel comfortable with the programming sequence, proceed to the question below.

Question: Ensure you are in the dialing filter programming level and enter all values from page 9 of the sample programming record.

Remember to include **filters 06 and 07** which you made up earlier.

REMOTE ACCESS PROGRAMMING CHART



Remote Access Package

A remote access package is used to control access to line pools and the Remote Page capability, for calls on incoming auto-answer trunks (Loop Start and E&M). The Norstar System allows up to 16 separately defined remote packages.

Two parameters are used to define each package: Line pool access and Remote page.

The default value of the Remote Access feature, for the Norstar System, is package 00. Remote access package 00 is used when no access to any of the line pools or to remote page is required. The default parameters of package 00 only allows access to target lines. The parameters of this package cannot be changed.

To allow incoming callers access to the remote page feature or to tandem calls using a trunk of a line pool, a remote package must be built and then assigned to a COS password.

The parameters associated with the other packages (01 to 99) are configured in the heading "Remote access packages" as shown in bold type on the facing page.

The example on page 10 of the sample programming record shows package #02 allowing remote access to line pool "B" and to the Remote Page feature.

Remote access packages along with dialing filters are used as parameters to define Class of Service Passwords.

Question: From page 10 of the sample programming record, list the line pools and features that package #01 allows access to.

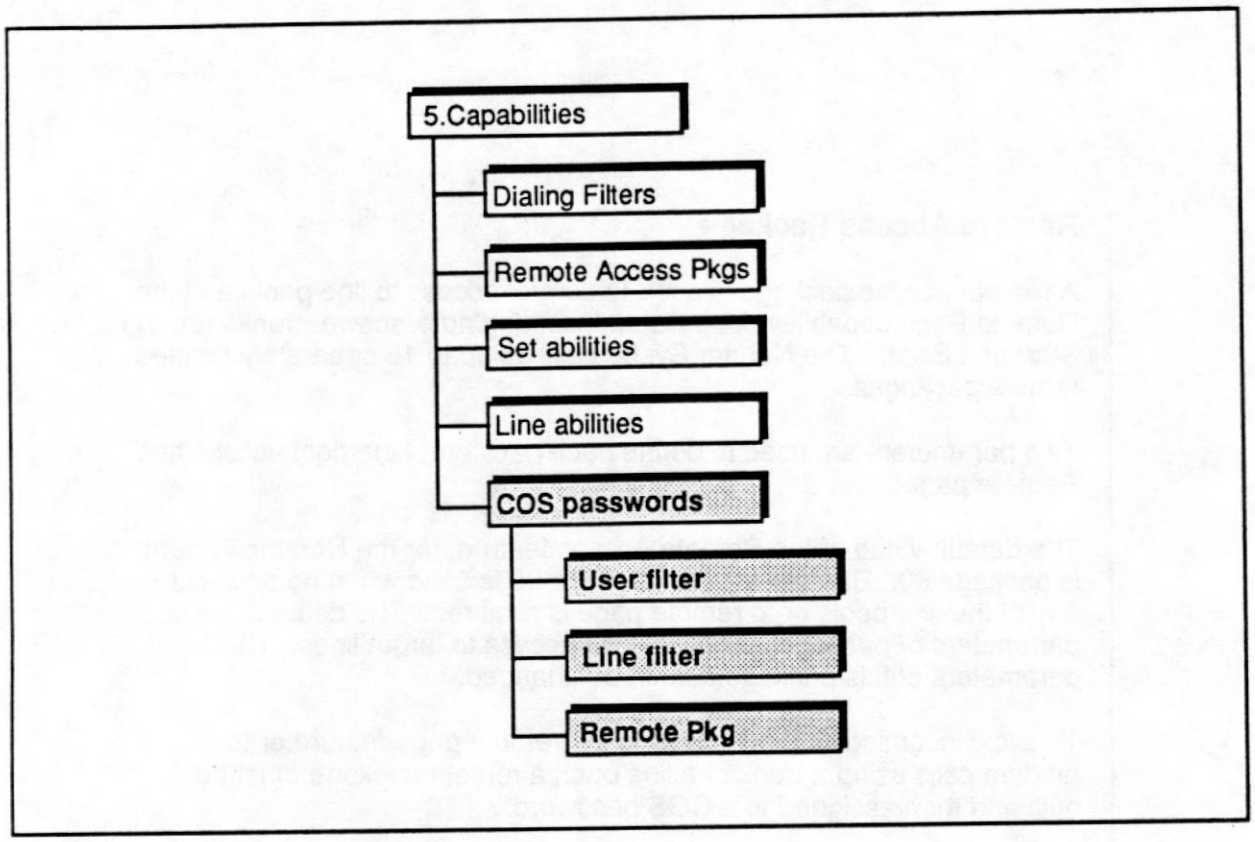
_____

_____

_____

_____

COS PROGRAMMING CHART



Answer:

Access is allowed to Line pool A and to the Remote Page Feature.

Class of Service

The Class of Service (COS) feature of Norstar is a list of passwords which permits controlled access to a system by remote users. Each remote user may be given a COS password to use to access Norstar remotely and to override dialing filter restrictions when calling from an internal station.

Typically, each user has a separate password. Several users may share a password or one user may have several passwords.

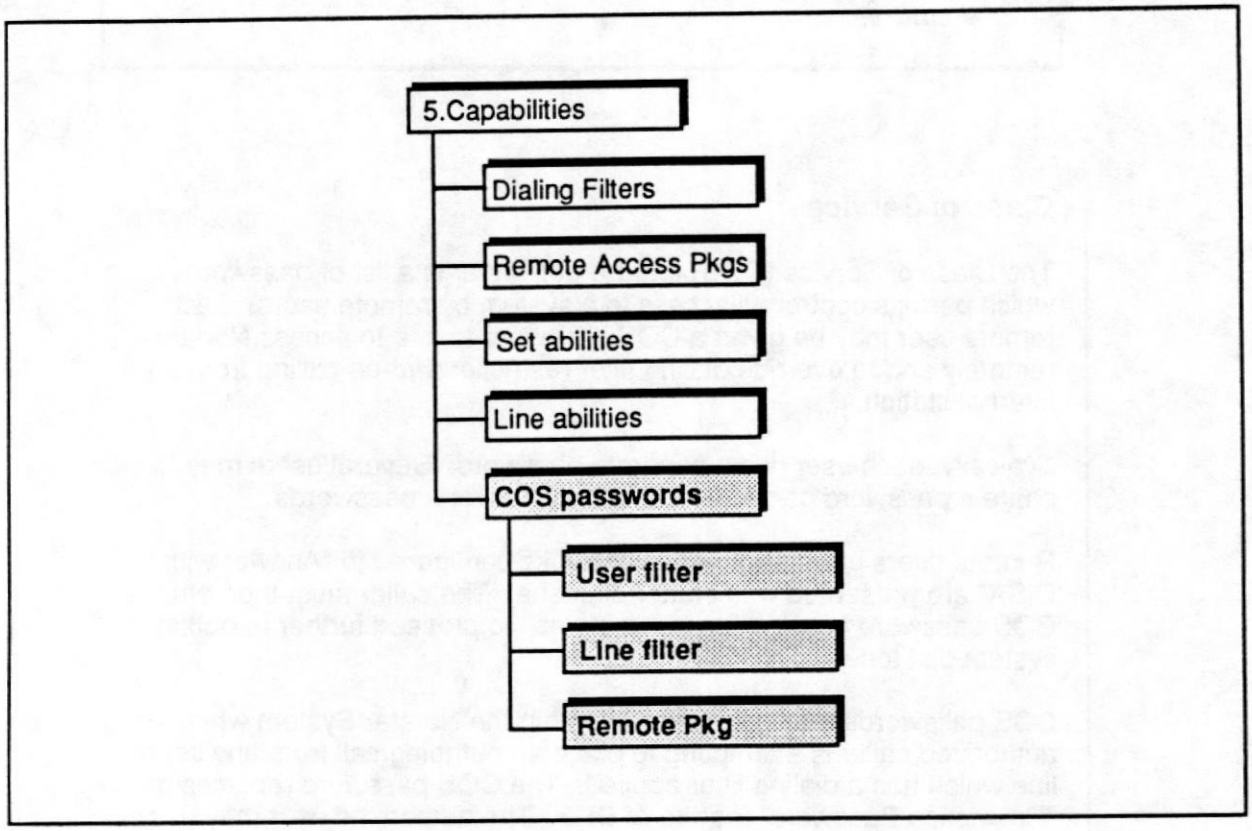
Remote users calling auto-answer trunks configured to "Answer with DISA" are presented with stutter dial tone. The caller must then enter a COS password to allow the incoming call to proceed further to obtain system dial tone.

COS passwords may also be used within the Norstar System when an authorized caller is attempting to place an outgoing call from any set or line which has a dialing filter applied. The COS password replaces the "Restriction Password" feature of DR3. The authorized user may use any restricted set or line by entering his COS password prior to placing the call.

Question: Referring to page 13 of the sample programming record, what is the maximum number of passwords available on a Norstar System?

_____

COS PROGRAMMING CHART



Answer:

100

Class of Service (continued)

The COS password consists of a six digit number which may be used to override dialing filters. Three programmable sections are used to enter data into the COS password to make up the specific requirements: user filter, line filter, and remote package.

User Filter

The user filter is a filter obtained from and as specified in the dialing filters table. When a COS password is used, the user filter replaces the set filter, line/set filter, or the remote filter that would otherwise apply to a call.

Line Filter

The line filter is a filter obtained from and as specified in the dialing filters table. When a COS password is used, the line filter replaces the line filter that would otherwise apply to a call.

Remote Package

The remote package replaces the remote access package that would otherwise apply to a specific call.

Question: List the three filter types that are used to define a Class of Service password.

_____

_____

_____

NOTES

Answer:

User filter
Line filter
Remote package

Review Work Exercise

Follow the steps listed below and enter the information into your captive system.

1. Beginning on page 8 of the sample programming record, enter the values as shown for "4. Direct-dial".

2. Proceed to page 11 and program all items associated with "Set abilities".

3. Continue entering values until the end of the programming record is reached. Ensure all parameters are programmed as shown on the sample programming record. Use default values for all features which are the same as DR3.

4. After you have completed the programming, proceed to the next Unit of the course; Unit 4 - Feature Operation.

NOTES

UNIT 4 - FEATURE OPERATION

This unit of the course is intended to give you some practical hands-on experience with the operation of DR4 features as applicable to the Norstar telephone sets. It is not intended to give you a complete guide to all Norstar features. Your previous Modular experience should have given you the opportunity to learn the features common to all Norstar Modular Systems.

The Feature Operation Unit will give you a chance to work with the Norstar sets to let you discover how the new features will assist the end user with interfacing with Modular DR4.

By completing this Unit you should gain enough knowledge of DR4 features and their operation to be able to assist customers with the daily use of the Norstar Modular DR4 features.

NOTES

Manual Answer Trunks

Incoming trunks of a Norstar Modular DR4 System may be programmed to be either "Manual Answer" or "Auto Answer" incoming calls. This programming is performed by the Installation or Maintenance person in Configuration Programming.

Manual Answer trunks operate the same as trunks of a DR3 system.

Question: Perform the following hands-on work exercise and then answer the question.

1. Line 1 and Line 2 of your captive system have been programmed to answer incoming calls differently in Configuration programming

2. Place a call from the SLT (Single Line Telephone) to Line 1 and then place a call to Line 2.

3. Which call were you required to answer manually?

   _____

NOTES

Answer:

The first call because Line 1 required the Line button of a Norstar set to be pressed manually to stop the incoming alerting signals.

Auto-Answer Trunks

Auto Answer trunks may be programmed to answer with or without DISA in Configuration programming.

When programmed to answer without DISA, the system automatically answers the incoming call and presents the caller with System dial tone. The caller has obtained access to the Norstar System.

When programmed to answer with DISA, the system automatically answers the incoming call and presents the caller with stuttered dial tone. The caller is then required to enter a valid COS password to obtain access to the System.

Note: All DID trunks are Auto Answer. E&M trunks may be programmed as either manual answer or auto answer.

Question: Perform the following hands-on work exercise and then answer the question.

1. Line 2 of your captive system has been programmed for Auto Answer.
2. Place a call from the SLT to Line 2.
3. Has Line 2 been programmed to answer with DISA or without DISA?

_____

NOTES

Answer:

Line 2 has been programmed to answer without DISA.

Auto-Answer Trunks (continued)

Auto-answer trunks which present the caller with system dial tone, are **not** programmed to answer with DISA. Upon automatically answering the incoming call, the Norstar System is prepared to receive and interpret digits strings from the caller. These digits strings are the digits programmed as the received numbers of the target lines.

Question: Follow the work exercise below and then circle the best answer to the question.

1. Place a call from the SLT to Line 2.

2. After the system automatically answers the call you will receive system dial tone. Enter the digits 457.

3. Which telephone set received an indication of an incoming call?

   a. The M7324 set, station 221.
   b. The M7310 set, station 222.
   c. The M7208 set, station 223.
   d. The M7208 set, station 224.

NOTES

Answer:

b. The M7310 set station 222.

Auto-Answer Trunks (continued)

Auto-answer trunks which present the caller with stuttered dial tone, are programmed to answer with DISA. Upon automatically answering the incoming call, Norstar sends stuttered dial tone to the caller and waits for the caller to enter a valid password. After a valid password is received, Norstar then presents the caller with system dial tone and waits for digits associated with a target line, a line pool access code, or the Remote Page feature.

When accessing a feature remotely, the caller is required to enter a '*' in place of pressing the 'Feature' button, as would normally be the case for using features internally.

For example, the Norstar Paging feature is accessed internally by pressing ∫ followed by the digits 1 and 1. The first digit 1 places the page announcement through the telephone sets' speakers and the second digit 1 is used to access paging zone 1. To use the Remote Page feature, the caller would enter •.

Question: Perform the following hands-on work exercise and then answer the question.

1. The telephone sets of your captive system are all, by default, in paging zone 1.
2. Place a call from the SLT to Line 3.
3. Upon receiving stuttered dial tone, enter the COS password that you programmed in Unit 3b which allows access to the Remote Page Feature.
4. After receiving system dial tone enter the Remote Page feature code, as outlined above, to page the sets in paging zone 1.
5. What COS password was used?

_____

NOTES

Answer:

311113

DID (Direct Inward Dialing) Trunks

DID trunks allow direct inward dialing from the public network to the Norstar System. A typical application is to map incoming digits onto target line appearances within the Norstar System. All DID trunks are auto-answer trunks.

When a call comes in on a DID trunk, Norstar interprets the incoming digits as follows:

- If the digits map onto a target line, Norstar routes the call to all sets with an appearance of that target line.
- If the digits map onto the DISA DN,the caller is presented with stuttered dial tone and must use a valid COS password to obtain system dial tone.
- If the digits map onto the Auto DN,the caller is presented with system dial tone.

Question: Perform the following hands-on work exercise and then answer the question.

1. Ask your Course Administrator for the numbers of the DID trunks assigned to your work position.
2. Program target lines 085 to 088 with the digits associated with the DID numbers. Refer to Unit 3a if required for programming information. (For CSA participants, this programming will have been previously completed.)
3. Assign the target lines to the Norstar sets as outlined below:

Target Line	Station
085	221
086	222
087	223
088	224

4. From the SLT, place a call to the second DID number.

5. Which station was alerted to the incoming call?

_____

NOTES

Answer:

Station 222

E&M Trunks

E&M Trunks give incoming and outgoing tie-line access from other systems in a private network to the Norstar System. E&M trunks may be configured as either manual or auto-answer.

When a call comes in on a manual answer E&M trunk, all telephones with that line appearance are alerted.

When a call comes in on an auto-answer E&M trunk, the Norstar will respond as follows:

- If the call is answered with DISA, the caller is presented with stuttered dial tone and must use a valid COS password to obtain system dial tone.
- If the call is answered without DISA, the caller is presented with system dial tone.

The training aid at your work position has been pre-wired and programmed to allow communication between the two E&M trunk positions of the E&M trunk cartridge.

Question: Perform the following hands-on work exercise and then answer the question.

1. At station 221, press the button labeled E&M.
2. Notice that the LCD of the button labeled E&M at station 222 is activated. The dial tone that you are receiving at station 221 is being supplied by this E&M trunk.
3. Dial the digits 459.
4. Which station was alerted to the incoming call?

_____

NOTES

Answer:

Station 224

Direct Dial

The Modular DR3 feature "Dial-0 Sets" has been renamed "Direct Dial" with DR4 software. The Direct Dial feature allows different Norstar sets to call to different central locations by dialing the same digit on the Intercom. The digit, which may be any digit from 0 to 9 dependent on other digits assigned to features, is assigned in Configuration programming.

In Unit 3b of this course, within Administration programming, you programmed station 221 and station 224 to call a specific station (their Direct-dial set) when the digit "0" is dialed on the intercom. You also programmed station 222 and 223 to call a different station when their sets dial the digit "0" on the intercom.

Question: Answer the questions presented, with information obtained from performing the following hands-on work exercises.

1. Press the intercom button of station 221 and dial the digit "0".
2. Answer and then release the call.
3. What intercom station number was the call placed to?
   _____.
4. Press the intercom button of station 223 and dial the digit "0".
5. Answer and then release the call.
6. What intercom station number was the call placed to?
   _____.

NOTES

Answer:

3. 222
6. 221

Selective Line Redirection

"Selective Line Redirection" is a new feature that allows selected lines to be forwarded to an external number. All lines of a Norstar System may have incoming calls directed to the same external number or selected lines may have incoming calls directed to different external numbers.

This feature must not be confused with the Norstar "Call Forward" feature. Call Forward forwards all calls that arrive at a specific Norstar telephone to another Norstar telephone within the Norstar System. Selective Line Redirection redirects only the specified line or lines independent of the Norstar telephones on which they appear, to a telephone set outside of the Norstar System. Selective Line Redirection takes precedence over Call Forward.

Question: Perform the following steps and then place your answer in the space provided.

1. At Station 222, enter the Selective Line Redirection code: ƒ°
2. Follow the prompts in the telephone sets display to redirect line 1 to 555-4321. Use Line 3 as the outgoing line.
3. At the M7324 set enter the Selective Line Redirection code.
4. Follow the prompts in the telephone sets display to redirect line 1 to 555-4321. Use Line 3 as the outgoing line.
5. What did the M7324 set's display indicate?

   _____

6. Cancel the Selective Line Redirection that you established by entering ƒ£° at station 222.

NOTES

Answer:

> *The display of station 221 indicated "REDIR by 222" with an option to "OVERRIDE".*

Unsupervised Conference

The Unsupervised Conference feature allows a Norstar set user to answer an incoming call and transfer the call to an outgoing line. The outgoing line may be either a Loop Start trunk or an E&M trunk. After all three parties have been connected the Norstar set user may then exit the call leaving the two outside parties connected.

To perform an Unsupervised Conference, a three party conference is set up and then the Norstar set controlling the conference call drops out of the conference.

1. An incoming call is answered by a Norstar set user.
2. The Norstar set user presses a free line button (¬) to place a call to a party outside of the Norstar System.
3. After the party answers the second call, the Norstar set user presses ∫ to make a 3-party conference.
4. The next step is for the Norstar set user to press the button of the held line (¬) followed by ∫ to drop out of the call.

Note: The Conference button and Transfer softkeys may be used in place of the Feature Codes.

This feature will function **only** with an **incoming** call. The KSU or Trunk Cartridge must have disconnect supervision and the line must be programmed as "Super". Otherwise the call cannot be automatically disconnected when complete; a disconnect signal from either party is required to drop the connection.

Once the Norstar user has set up the Unsupervised Conference and has dropped out of the call, the user cannot re-access the conference.

Question: Refer to the "Telephone features" section of the Installer Guide and circle the best answer.

The feature code used to transfer out of a conference and create an unsupervised conference is:

a. ∫
b. ∫
c. Both of the above.
d. None of the above.

NOTES

Answer:

b. f

Dialing Filters

The dialing restrictions and exceptions programmed in the previous Unit of the course were assigned as dialing filters to:

1. sets, as Set Filters
2. lines, as Line Filters
3. lines on a set, as Line/Set Filters
4. remote filters
5. Class of Service passwords.

1. Set Filter

When a dialing filter is applied to a set all restrictions and exceptions associated with that particular filter apply to all lines on the telephone set.

For example, a set with four lines in the warehouse is not required to place any toll calls. By applying a set filter, all lines could be restricted from placing toll calls.

Question: Station 223 of your captive system was assigned dialing filter 05 as a set filter.

1. From Line 1, dial the digits 1-555-4913.

2. From Line 2, dial the digits 1-555-4913.

3. By applying a set filter to the set, were both calls restricted?

_____

NOTES

Answer:

Yes, all line appearances at station 223 are restricted from placing calls to 1-555-4913.

2. Line Filter

A line filter applies to specific line of a system on a system-wide basis. All sets with that line appearance will be subject to the restrictions and exceptions associated with the filter applied to that one line only. When a dialing filter is applied to a line, only that line of a given unrestricted set is affected.

For example, Line 4 of a system is a WATS (Wide Area Telephone Service) line and all calls placed on this line must be directed to specific number. By applying a dialing filter to this one line, all sets in the system are only allowed to use the line for its intended purpose.

Question: On your captive system, you assigned dialing filter 05 as a line filter to one of the lines of the system.

1. From station 222, on line 1 dial the digits 1-555-4913.
2. From station 222, on line 2 dial the digits 1-555-4913.
3. Which line has the dialing filter assigned, Line 1 or Line 2?

_____

NOTES

Answer:

Line 2

3. Line/Set Filter

A line/set filter is applied to a specific line on a set and takes precedence over any other dialing filter which may apply to a line or a set.

For example, a set in a warehouse could be restricted from placing toll calls to all area codes by applying a dialing filter to the set, as a set filter. The warehouse staff may be required to place calls to the head office on one of the lines. By assigning a dialing filter, as a line/set filter, to one of the lines, the required scenario may now be accomplished to permit toll calls to the head office.

Question: As previously demonstrated, station 223 is unable to place calls to 1-555-4913 from either line 1 or line 2. Dialing filter 07 was assigned as a line/set filter to one of the lines of station 223.

1. Dial the digits 1-212-555-4913 on line 1 of station 223.
2. Dial the digits 1-212-555-4913 on line 2 of station 223.
3. Which line has dialing filter 07 assigned as a line/set filter?

_____

NOTES

Answer:

Line 2

4. Remote Filter

A dialing filter may be used to create a Remote Filter to control dialing on incoming auto-answer lines used for making tandem calls. Remote filters are only applied to lines.

For example, an employee can be allowed to call into a Norstar system remotely on an auto-answer line and then call out on a line designated for toll calls to specific area codes.

Remote filters should not be confused with Remote Access Packages. Remote filters control dialing on incoming auto-answer trunks; Remote Access Packages control access to line pools and the Remote Page capability for calls on incoming auto-answer trunks.

Question: From the programming record, list the dialing filter and remote access package which has been assigned to line 003.

Dialing Filter ..... _____

Remote Access Package ..... _____

NOTES

Answer:

Dialing Filter 06
Remote Access Package 00

5. COS Password

As demonstrated previously in this Unit, a Class of Service (COS) password can be used to permit access to the Norstar System when incoming auto-answer trunks are programmed to answer with DISA. COS passwords may also be used to allow authorized persons to place outgoing calls on otherwise restricted lines.

COS passwords are defined and then given to employees who may be required to override set, line, or remote filters assigned to sets or lines. They can be specifically tailored to meet the requirements of the individual user.

For example, an executive may be required to place a toll call from a set in the warehouse which has been assigned a set filter that does not allow toll calls. By entering his COS password, the executive can now access toll facilities. This same password may be used by the executive to override any remote filters which have been applied to incoming auto-answer trunks. Although an auto-answer trunk may be assigned a remote filter which controls dialing of toll calls, the password can be configured to override the remote filter and allow toll calls for the executive.

Question: To use the COS password feature, the COS feature code is entered (∫ °) before the COS password is entered.

1. Access line 1 of station 223.
2. Use the COS feature code and then enter the digits associated with COS password 00.
3. Dial the digits 1-555-4913.
4. Is set 223 restricted from toll calls after the COS password has been entered?

   _____

NOTES

Answer:

No

REVIEW QUESTIONS

Answer the following statements as either True or False.

1a. The Direct dial number can be a digit from 0 to 9 dependent on numbers assigned in the Norstar numbering plan.

_____

1b. When the Direct dial number programming is set to "none" the Direct Dial feature will be disabled..

_____

2. Selective Line Redirection does not allow intercom numbers to be externally forwarded.

_____

3. An unsupervised conference can be made by a Norstar set placing two outgoing external calls.

_____

4. Dialing filters can be used as set filters, line filters, line/set filters, and as remote filters applied to lines.

_____

5. A COS password cannot override a restrictive dialing filter applied as a remote filter when accessing a Norstar System remotely.

_____

6. Auto Answer trunks programmed to answer with DISA require the caller to enter a COS password.

_____

Upon completion of the review questions, have your Course Administrator check your answers.

If you are an Installation or Maintenance person, please continue to Unit 5 - Troubleshooting. If you are a Service Advisor, you have now completed the portions of the course specific to your job function.

NOTES

UNIT 5 - TROUBLESHOOTING

The troubleshooting Unit of this course will give you some suggestions pertaining to troubleshooting procedures and techniques used to isolate problems within a Public or Private Network.

Troubleshooting a PBX/Key System is a process to determine or isolate a problem to a specific source. Generally, the cause of the trouble can be narrowed down or sectionalized to one of five Major areas:

- User problem
- Set problem
- Wiring problem
- Network problem
- PBX/Key System equipment problem

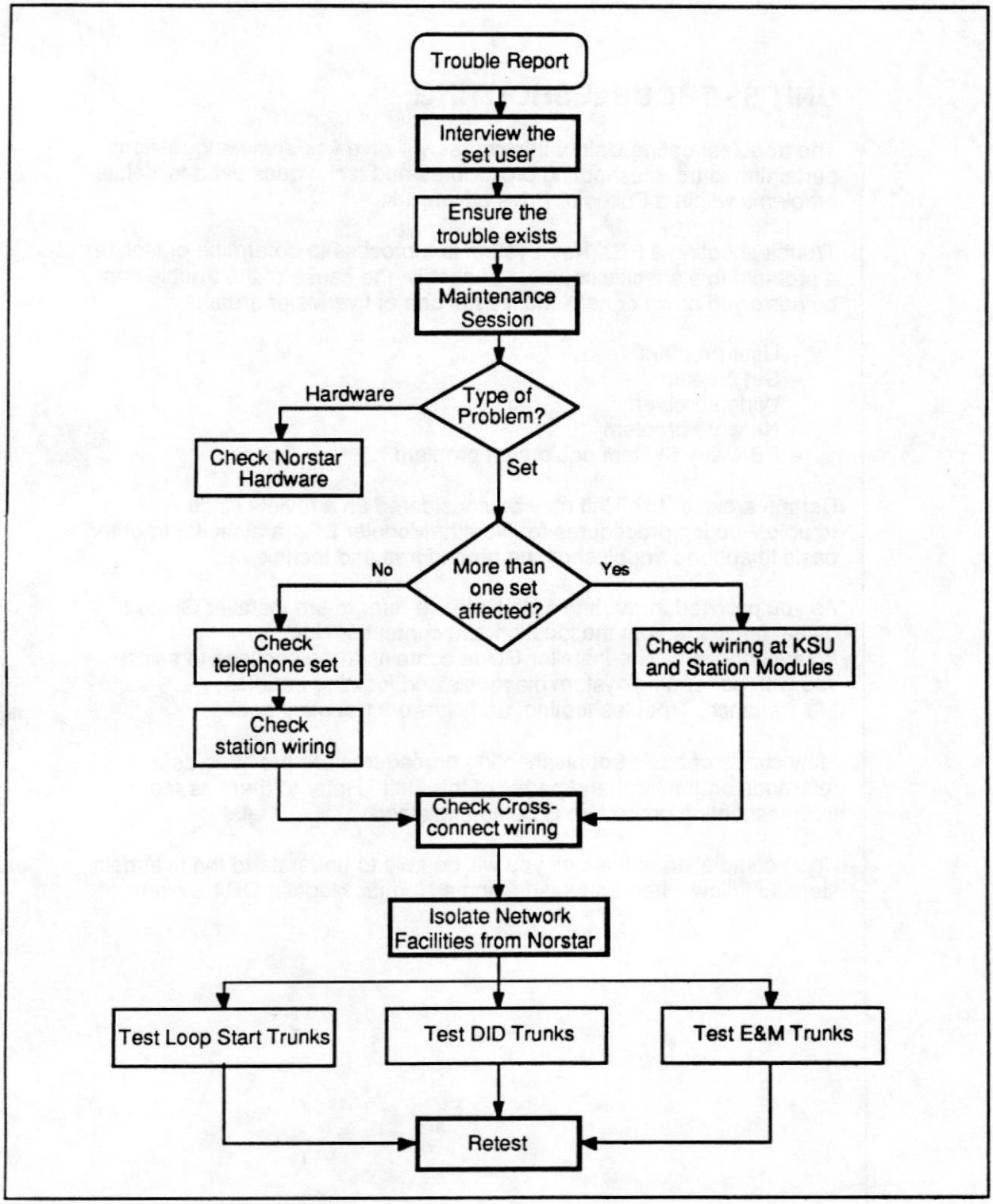
Certain areas of this Unit may be considered as a review since troubleshooting procedures for Norstar Modular DR4 are similar to other basic telephone troubleshooting procedures and techniques.

As you proceed through this Unit, please refer to the Installer Guide to obtain familiarity with the location and content of Norstar troubleshooting. The Installer Guide contains three sections to assist you with performing system diagnosis and locating troubles: Maintenance, Troubleshooting, and Network troubleshooting.

Flow charts of basic troubleshooting procedures are provided as a reference on the left-hand pages of this Unit. Refer to them as the troubleshooting procedure is being explained.

Upon completion of this unit you will be able to understand the five main steps to follow when troubleshooting a Norstar Modular DR4 System.

Troubleshooting Chart



Troubleshooting Overview

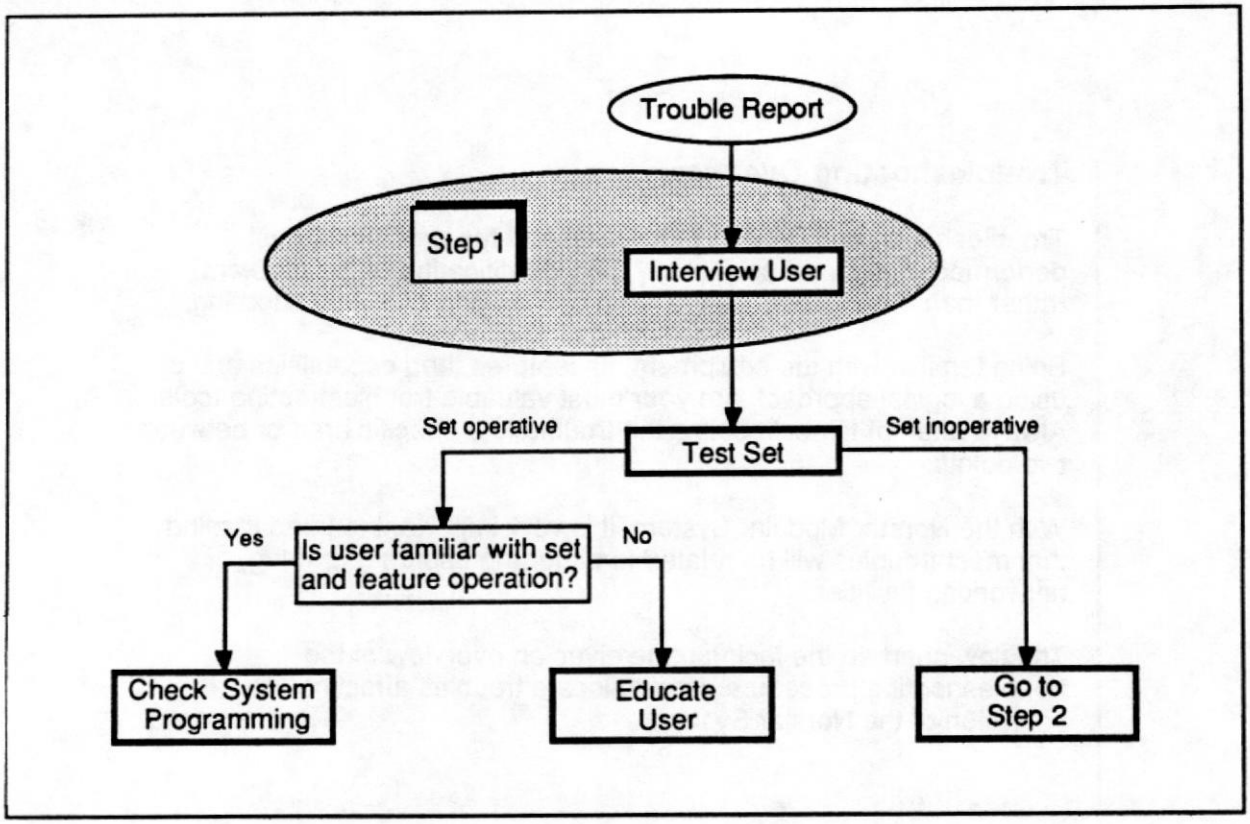
Troubleshooting regardless of the cause of the problem is best performed in a logical sequence. The identification of the problem rather than the symptom is the most difficult part of troubleshooting.

Being familiar with the equipment, its features, and capabilities and by using a logical approach are your most valuable troubleshooting tools. Always attempt to sectionalize the trouble to a specific area or between two points.

With the Norstar Modular System, it is very important to keep in mind that most troubles will be related to either the user, sets, wiring, or networking facilities.

The flow chart on the facing page gives an overview of the troubleshooting procedure used to locate troubles affecting the operation of the Norstar System.

Troubleshooting Chart Step 1



Troubleshooting Step 1

The first logical step in the trouble shooting procedure is to start at the Norstar telephone set reporting the trouble. Locate the user who reported the problem and have him/her explain or demonstrate the problem.

Test the telephone set where the problem was experienced to verify that the problem does occur.

If the set is functional and if the user has identified that the trouble appears only at the one set, re-test the set's functions and features. Ensure that the user is familiar with the Norstar set and Modular System features. Many trouble reports originate from set users who do not understand the capabilities of their telephone system. Education of the set user may be required.

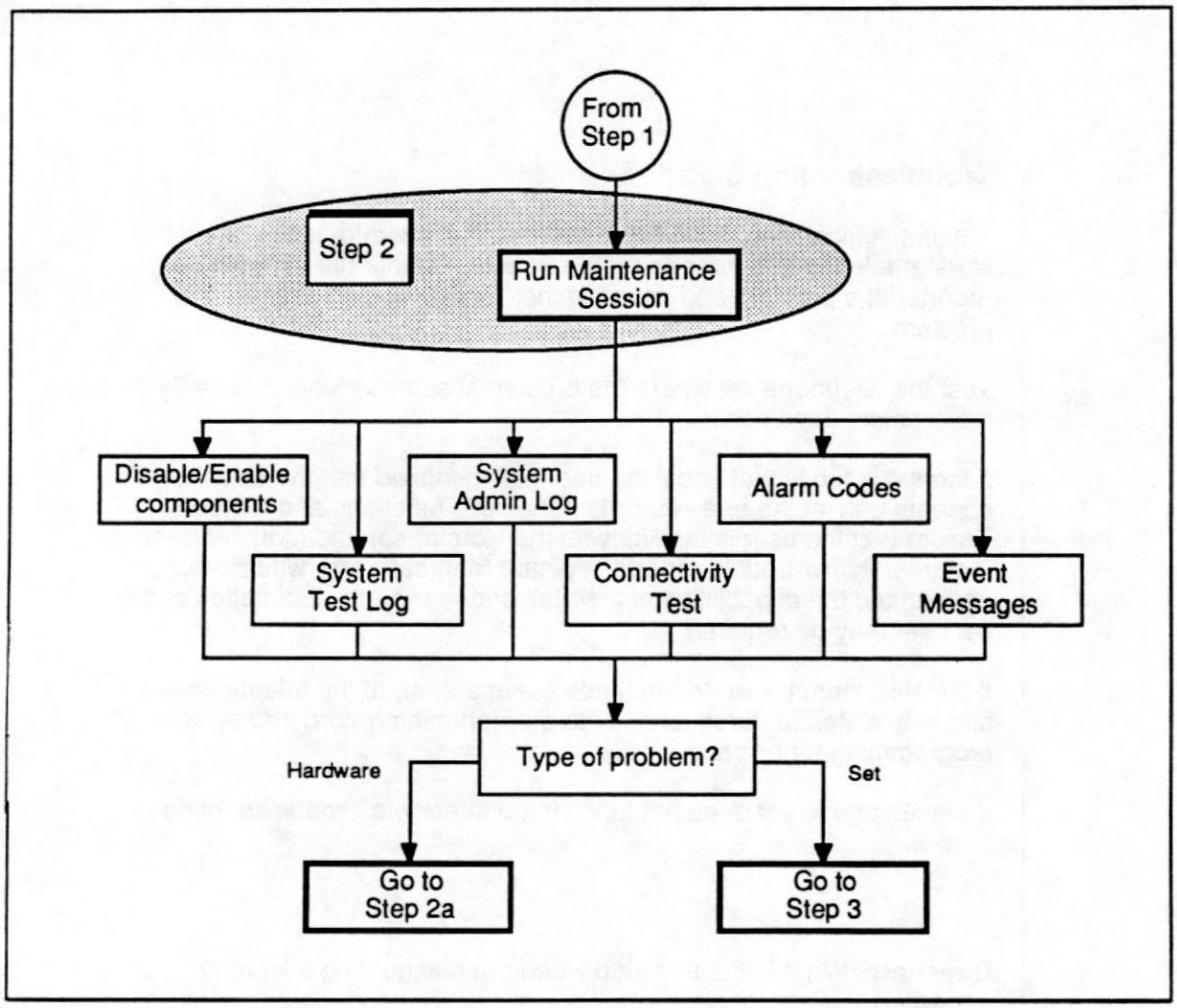
If the Norstar set user understands the operation of the telephone set and associated features, check the programming record and system programming for errors.

If the telephone set does not function go directly to Troubleshooting Step 2.

Question: What is the first step when troubleshooting a Norstar System?

_____

Troubleshooting Chart Step 2



Answer:

Step 1 - Interview the user to verify the trouble.

Troubleshooting Step 2

Step 2 of the troubleshooting procedure is to perform a Maintenance Session from a working telephone set.

A Maintenance session is a Norstar software feature which can assist you with the diagnosis of problems which may arise with the Norstar System.

The Maintenance session can be used to:

- Disable/Enable ports, cartridges, and modules.
- Run a connectivity test through diagnostics.
- Examine the System Test Log.
- Examine the System Administration Log.

A detailed description of performing a Maintenance session is located in the Installer Guide, Section 8.

Question: Referring to the Maintenance section of the Installer Guide, complete the following information:

a. Alarm:61-X-Y _____

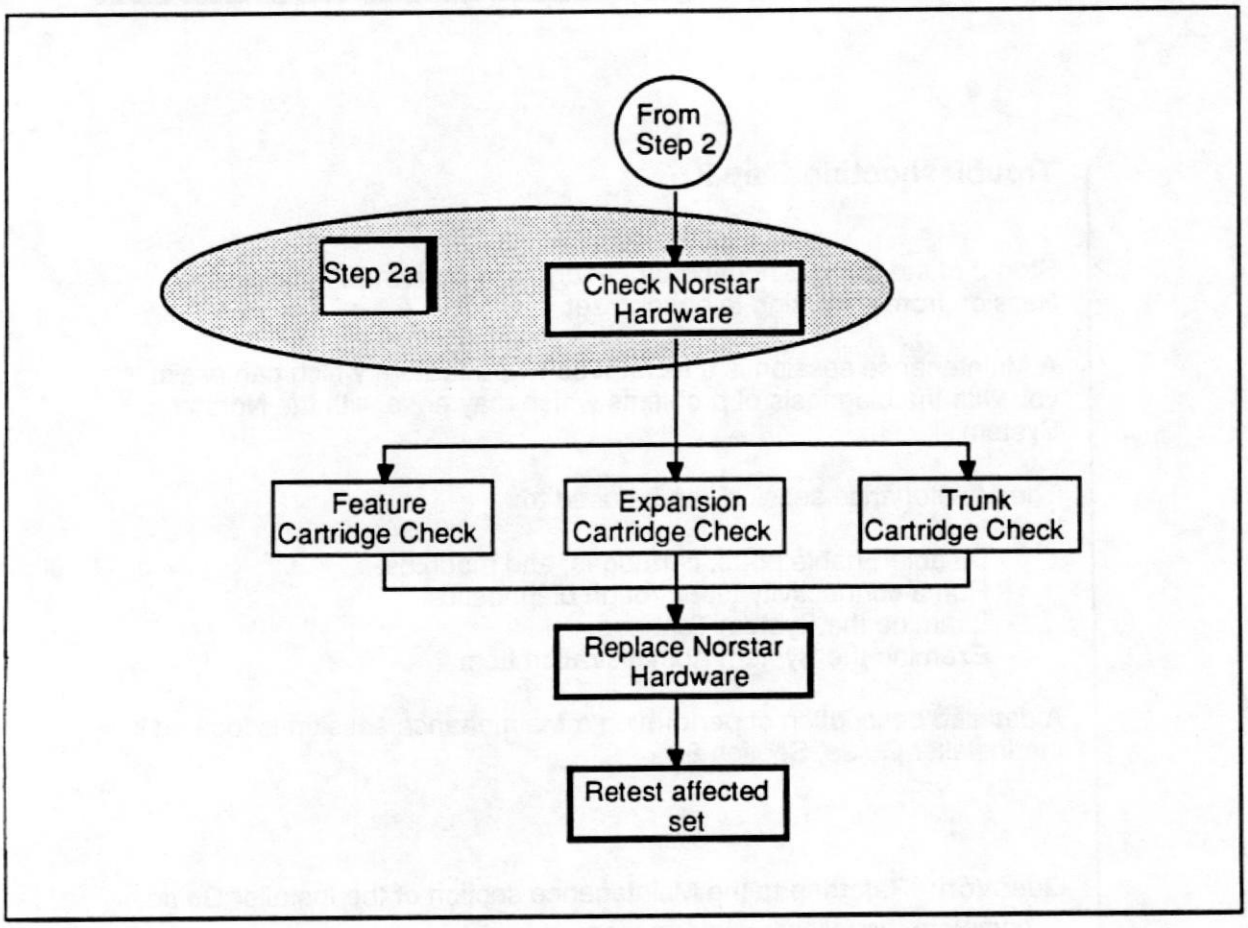
b. Evt:268-05 S8 _____

_____

_____

c. Does Evt:268-05 generate a system restart? _____

Troubleshooting Chart Step 2a



Answer:

a. Incompatible Trunk Cartridge
b. Dialing filter 05 has lost data
c. No

Troubleshooting Step 2a

The Port/DN Status function of the Maintenance Session may be used to disable and enable ports. A non-functioning set, line, or group of sets or groups of lines should be disabled and then enabled to ensure equipment functionality.

The Maintenance Session should identify if the suspected problem is located within the system hardware (KSU or associated trunk or station module) or with the telephone set environment.

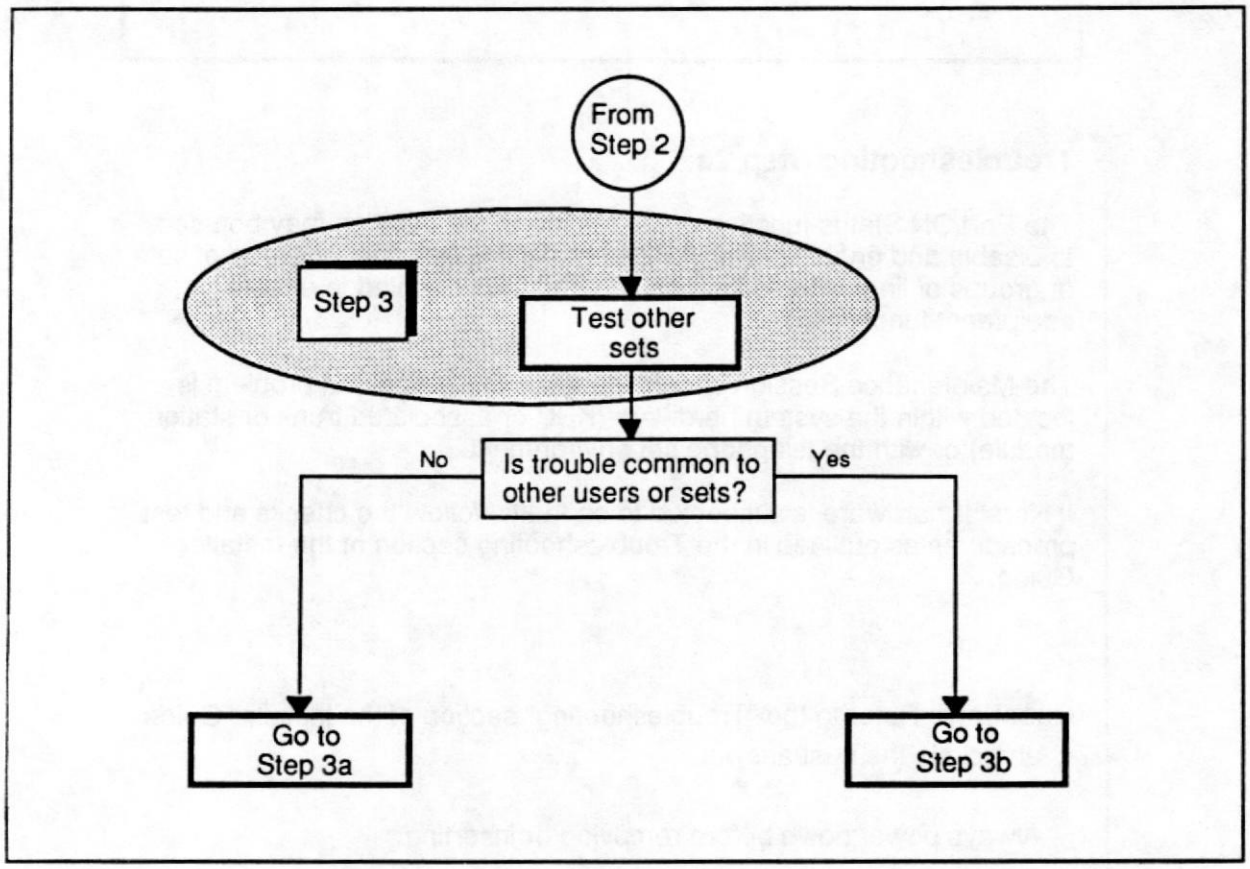
If Norstar hardware is suspected to be faulty, follow the checks and test procedures as outlined in the Troubleshooting section of the Installer Guide.

Question: Refer to the "Troubleshooting" section of the installer Guide and circle the best answer.

Always power down before removing or inserting:

a. the Feature Cartridge
b. the Expansion Cartridge
c. a Trunk Cartridge
d. only the Feature Cartridge and Expansion Cartridge
e. the Feature Cartridge, Expansion Cartridge, and Trunk Cartridges

Troubleshooting Chart Step 3



Answer:

e. the Feature Cartridge, Expansion Cartridge, and Trunk Cartridges

Troubleshooting Step 3

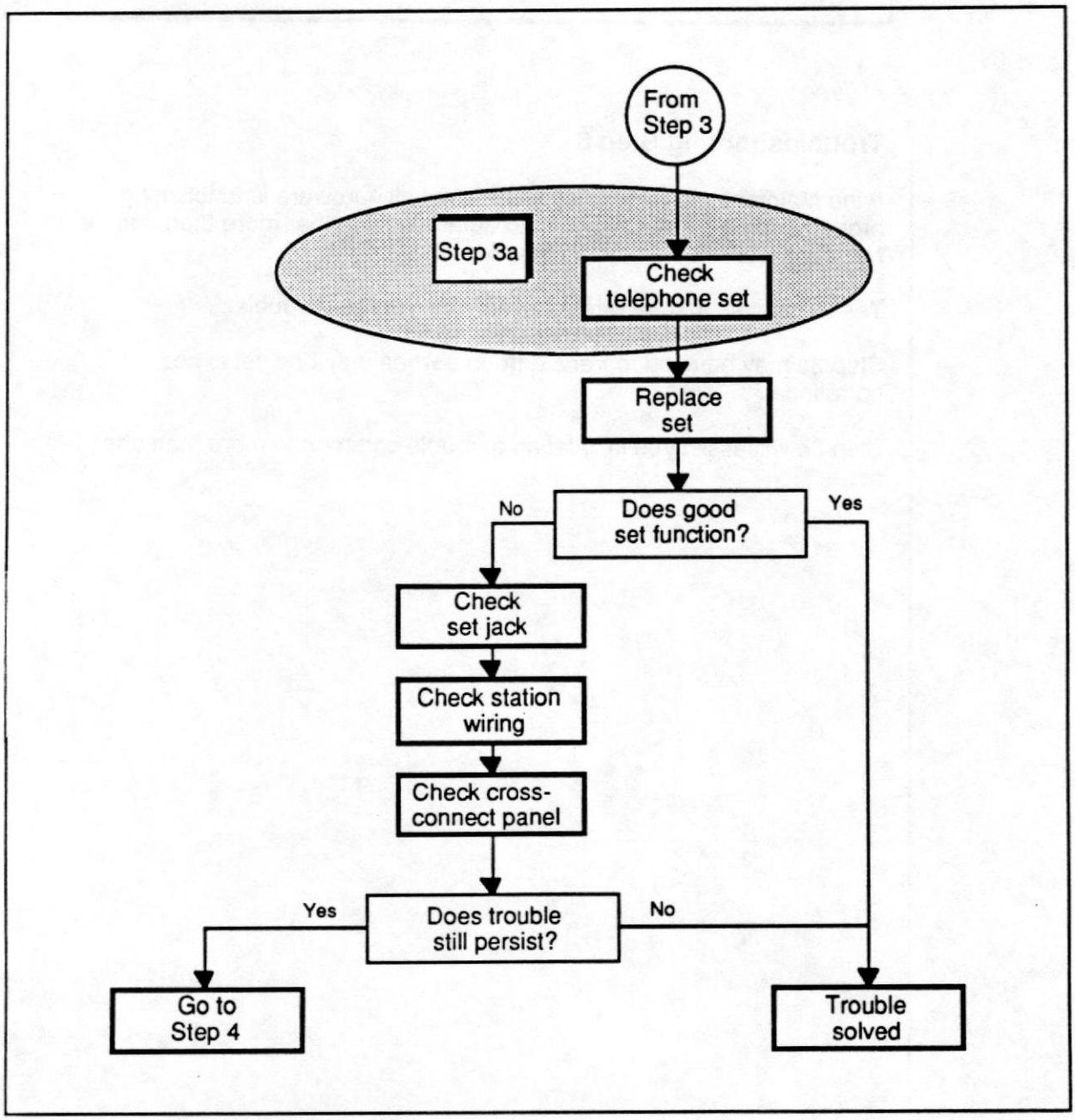
If the Maintenance Session indicates that all hardware is functioning properly, run a connectivity test to determine whether more than one Norstar set is affected by the trouble.

Test other sets in the system to verify the reported trouble.

Step 3a may be used to trace a trouble when only one set is non-op rational.

Step 3b will assist you in locating a trouble common to more than one set.

Troubleshooting Chart Step 3a



Troubleshooting Step 3a

Running a Maintenance Session in Step 2 will indicate whether the problem is specific to one set or common to other sets in the system. Other sets should be tested to ensure the existence of a common trouble.

If the problem is specific to one set, replace the set with a known good set. Upon replacement of the suspected set and if the good set is inoperative, the next logical step is to check the jack that the set is connected to, the station wiring, and the associated connections at the cross-connect panel.

Check the station loop with an ohmmeter to ensure that the loop resistance does not exceed 59 ohms on 24 gauge wiring. If the loop is greater than 305 meters (1000) feet), ensure that a Norstar Station Auxiliary Power (SAPS) is in place and functional.

Check that all cross-connect wires are attached and connected to the designated pins.

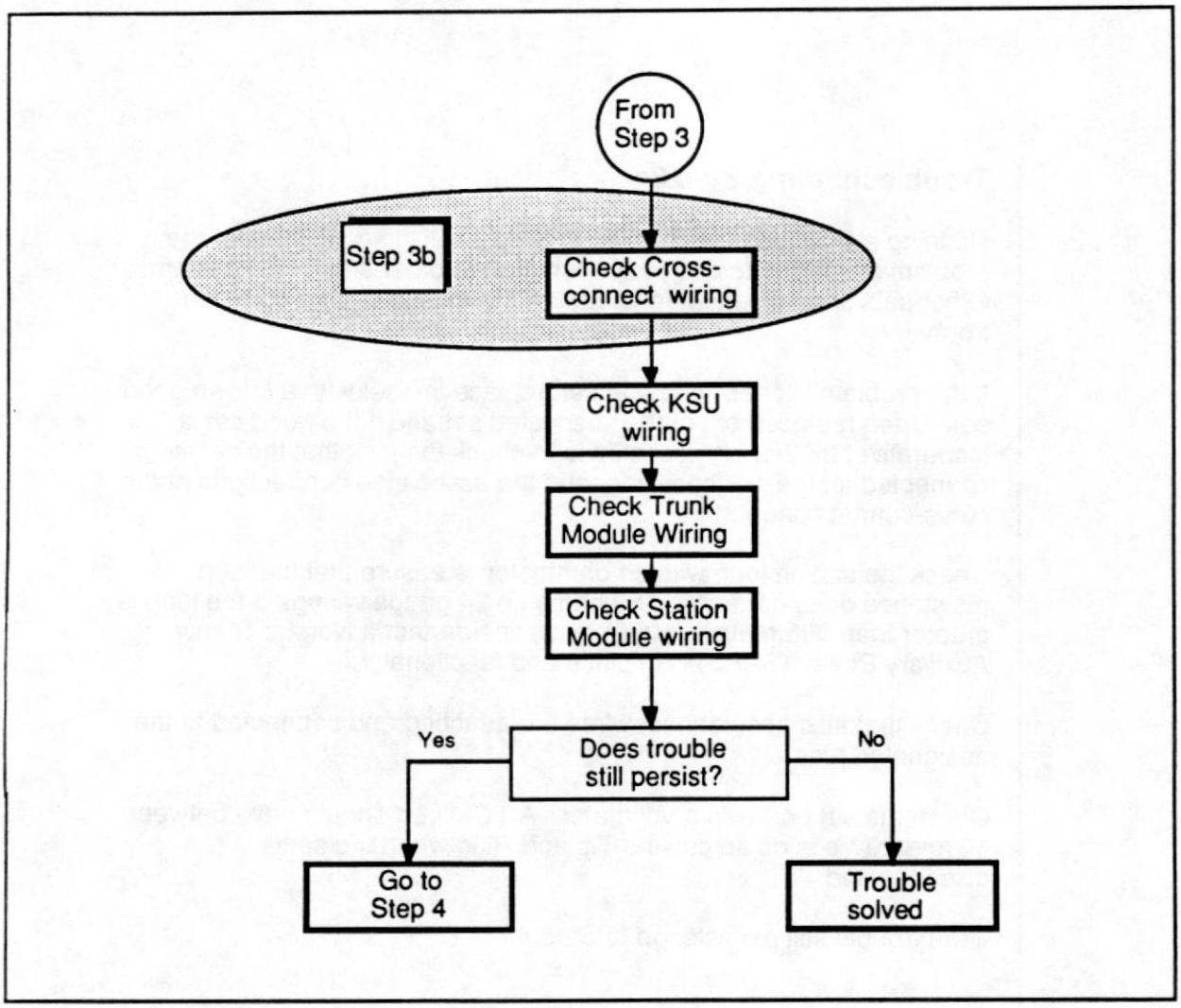
Check the set port with a voltmeter. A TCM port should have between 15 and 20 Volts dc across the Tip and Ring when the set is disconnected.

If the trouble still persists, go to Step 4.

Question: If the Norstar set at the location of the reported trouble is not functioning would you:

a. Replace the set and then test other sets?
b. Test another set to determine if the trouble is common to more than one set?
c. Replace the Station Module?

Troubleshooting Chart Step 3b



Answer:

> *b. Test another set to determine if the trouble is common to more than one set?*

Troubleshooting Step 3b

If the trouble is affecting the operation of more than one set, and the Maintenance Session showed that the KSU and associated modules are functioning correctly, check the wiring from the KSU, Station Modules, and Trunk Modules to the cross-connect panel.

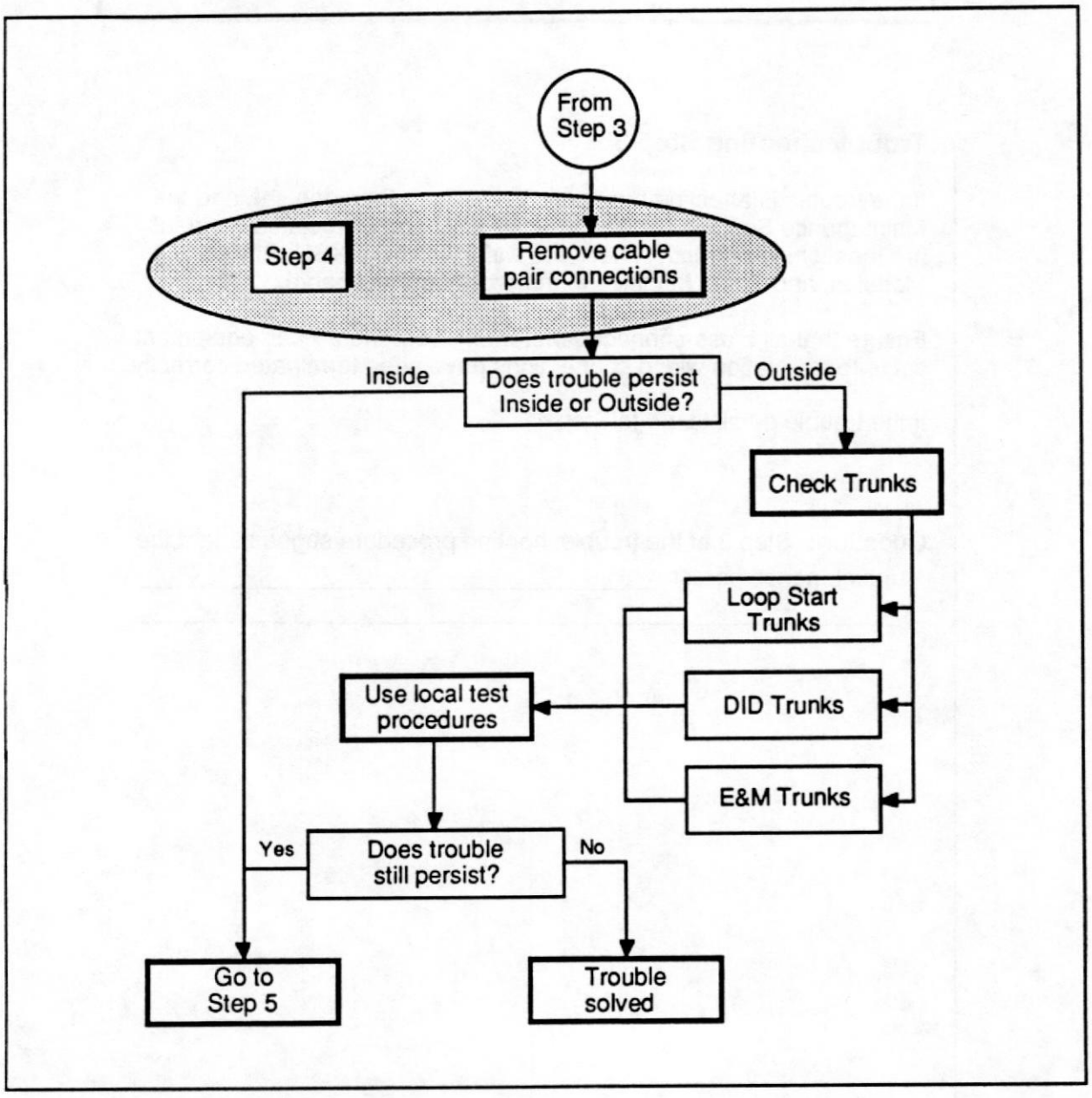
Ensure that all cross-connect panel wiring from the 25-pair equipment cable to the station wiring connections have been terminated correctly.

If the trouble persists, go to Step 4.

Question: Step 3 of the troubleshooting procedure suggests that the maintenance person _____

_____

Troubleshooting Chart Step 4



Answer:

Check all wiring at the cross-connect panel.

Troubleshooting Step 4

Step 4 of the troubleshooting procedure is performed after all affected sets and station wiring have been checked. This step determines whether the reported trouble is located within the user's premises or within the Network environment.

Problems such as a "dead" outside trunk may or may not be associated with the networking facilities. The best way to determine the location of this type of trouble is to isolate the problem as either "inside" or "outside" by removing the connection between the outside cable pair and the Norstar System.

The following troubleshooting flow charts are separated into the three types of trunks which may be connected to Norstar:

Chart 4a - Loop Start Trunks
Chart 4b - DID Trunks
Chart 4c - CO Isolation
Chart 4d - E&M Trunks

The flow charts are designed to assist you with testing Norstar in relation to the trunking features. To test the trunk itself, follow your local procedures.

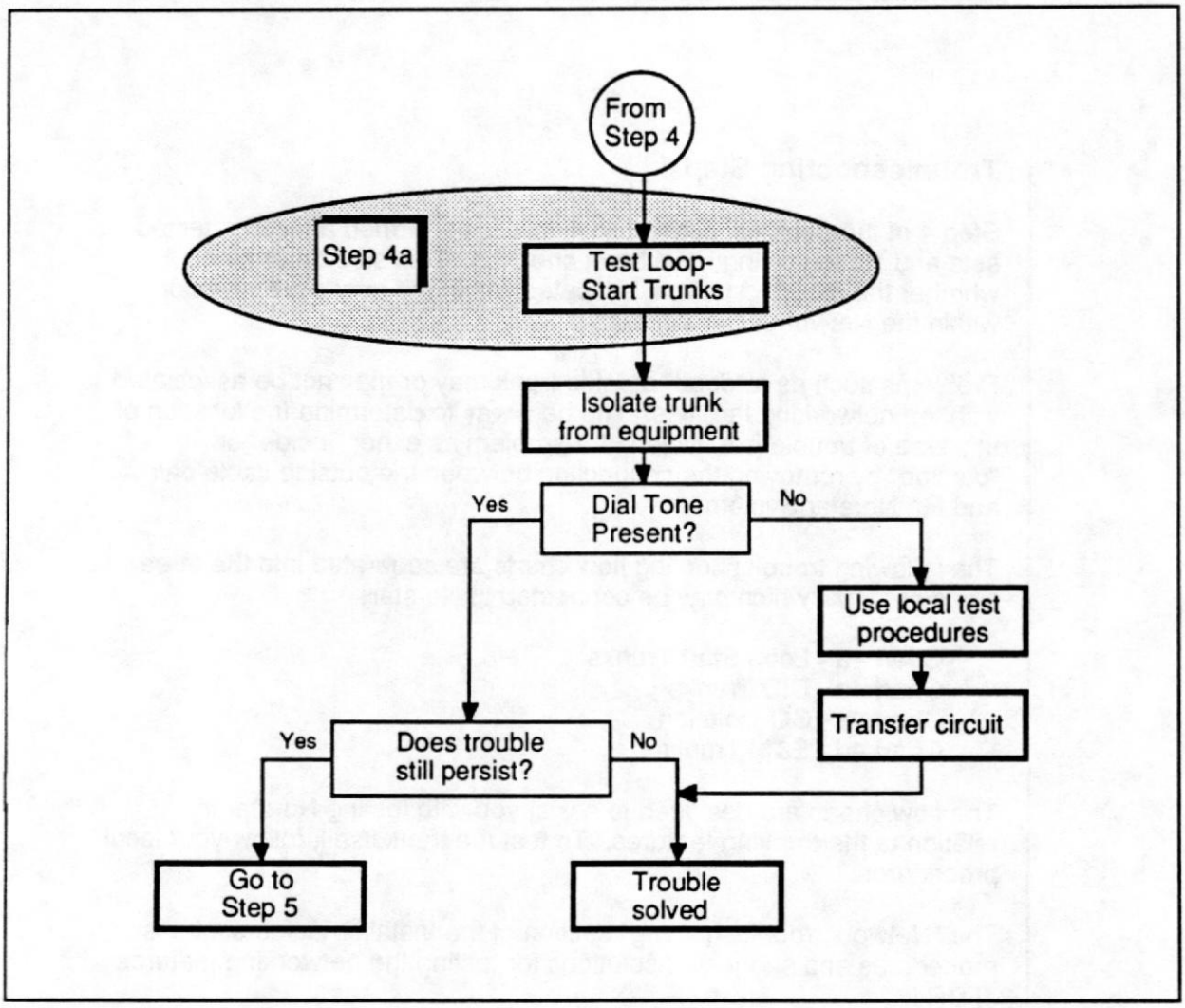
The "Network troubleshooting" section of the Installer Guide contains procedures and suggested solutions for testing the networking features of DR4.

Question: How can the Norstar System be isolated from incoming CO Lines?

_____

_____

Troubleshooting Chart Step 4a



Answer:

> *Isolation is performed by removing connections between the Norstar System and the Telco cable pair.*

Troubleshooting Loop Start Trunks

After the loop start trunk has been isolated, connect a telephone test set (Butt-In) or a single line telephone set to the cable pair. Incoming and outgoing loop start trunks should have dial tone from the public network on them when the line is idle.

If dial tone is not present on the associated cable pair, use your local procedures to have the circuit transferred to a known good cable pair.

If dial tone is present, the problem may be located either in Norstar System programming or in the hardware.

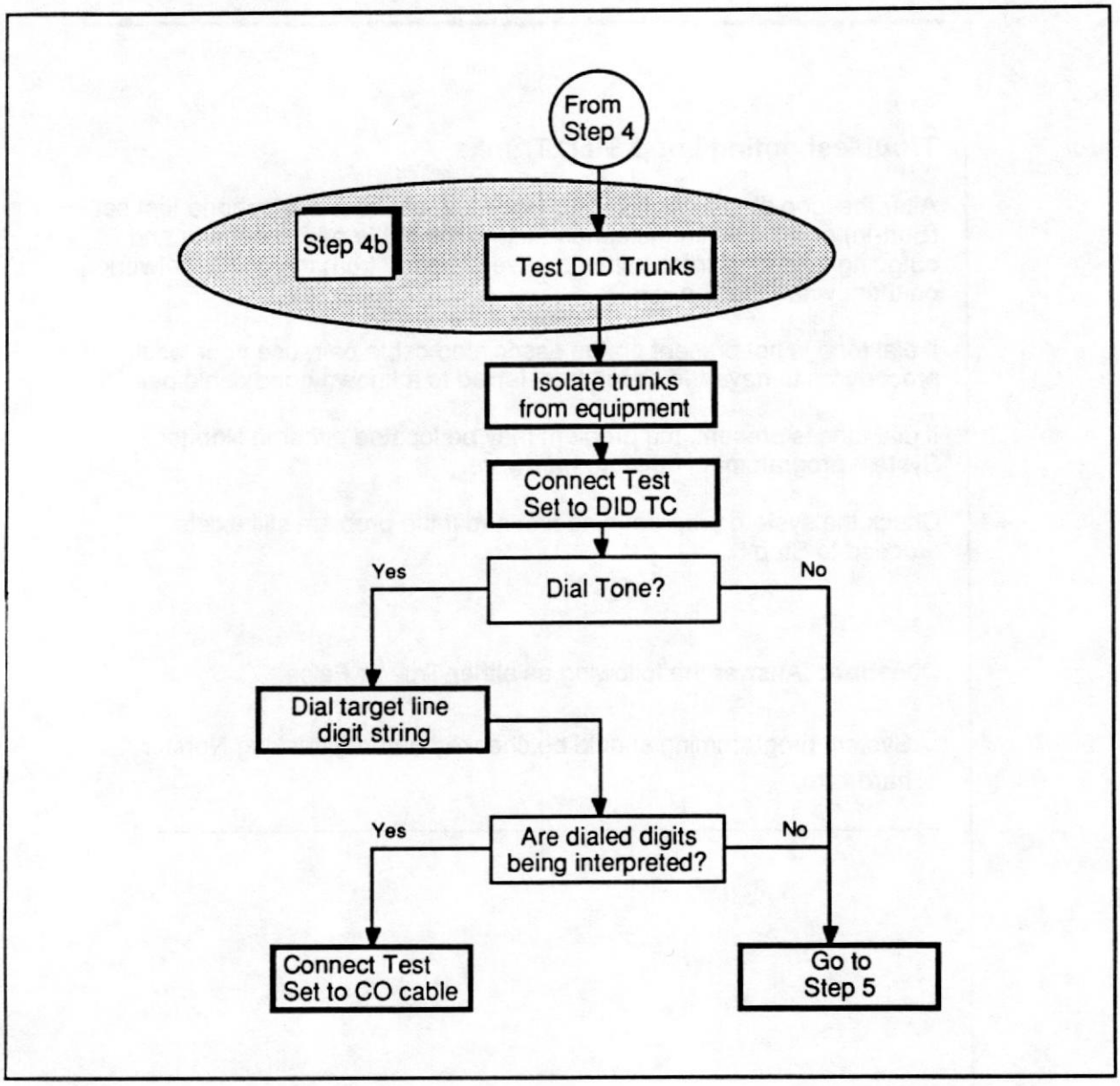
Check the system programming first and if the problem still exists proceed to Step 5.

Question: Answer the following as either True or False.

System programming should be checked before checking Norstar hardware.

_____

Troubleshooting Chart Step 4b



Answer:

True

Troubleshooting DID Trunks

When testing DID trunks ensure that all target line programming is accurate. The Signal setting of either "WinkStart, Immediate, or DelayDial" must match the requirements of the Central Office.

Verify that the Central Office is sending the correct number of digits and that Norstar configuration programming has been defined to match the incoming digit length.

If Norstar programming is determined not to be the cause of the trouble, DID trunks may be isolated from the Norstar system by removing the connections between the Telco cable pair and Norstar System.

After the connections have been removed between the Telco cable pair and the Norstar DID trunk cartridge, a Butt-in or a single line set may be connected to the input of the DID trunk cartridge. Dial tone should be heard when the test set goes off-hook.

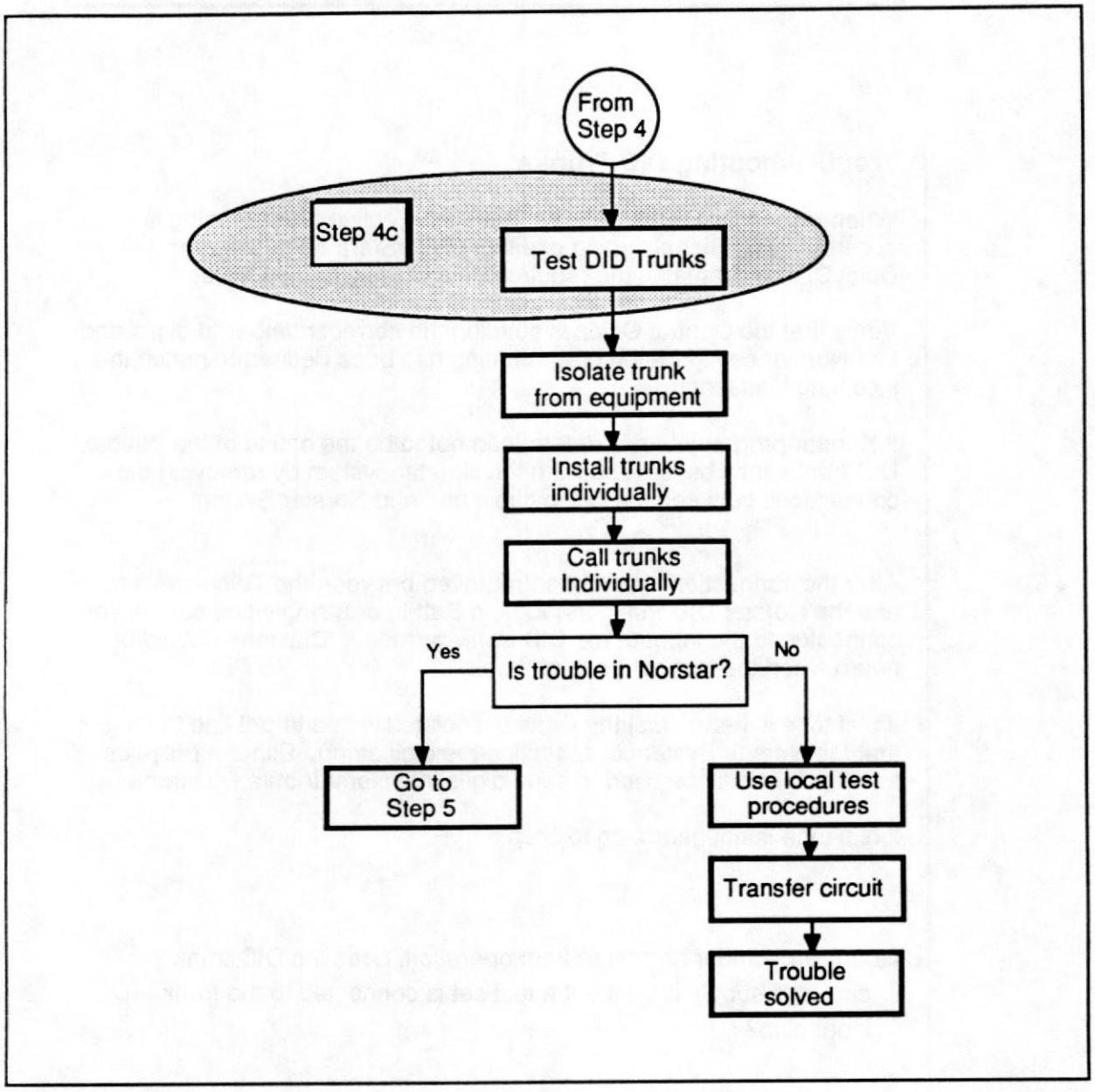
If dial tone is heard, dial the digits associated with a target line to ensure that the Norstar System is accepting the digit string. Either a pulse or tone test set may be used to send digits into Norstar on a DID trunk.

If dial tone is not heard, go to Step 5.

Question: Under normal system operation, does the DID trunk cartridge supply dial tone if a test set is connected to the trunk input pins?

_____

Troubleshooting Chart Step 4c



Answer:

Yes, a DID trunk cartridge will offer dial tone to a test set when seized with a test set.

Troubleshooting DID Trunks (continued)

After you have proven that Norstar is receiving digits on the target lines, connect the test set to the CO cable.

Telco DID trunks **do not** have dial tone on them and therefore standard ways of monitoring for loop start trunk operation cannot be used.

To isolate the trouble to one of many DID trunks installed on a system, remove all DID trunk connections from the Trunk Module. Replace only one DID trunk connection and then, using a test set connected to a loop start trunk, place a call to one of the DID directory numbers. If the call proceeds in the normal manner it may be assumed that this one DID trunk is functional. Remove this connection and then connect a different DID trunk to the Norstar System. Again, connect your test set to a loop start trunk and place a call to one of the DID directory numbers Continue this process until all DID trunks have been tested.

If the trouble is found to be associated with the incoming cabling, use your local procedures to obtain a circuit transfer.

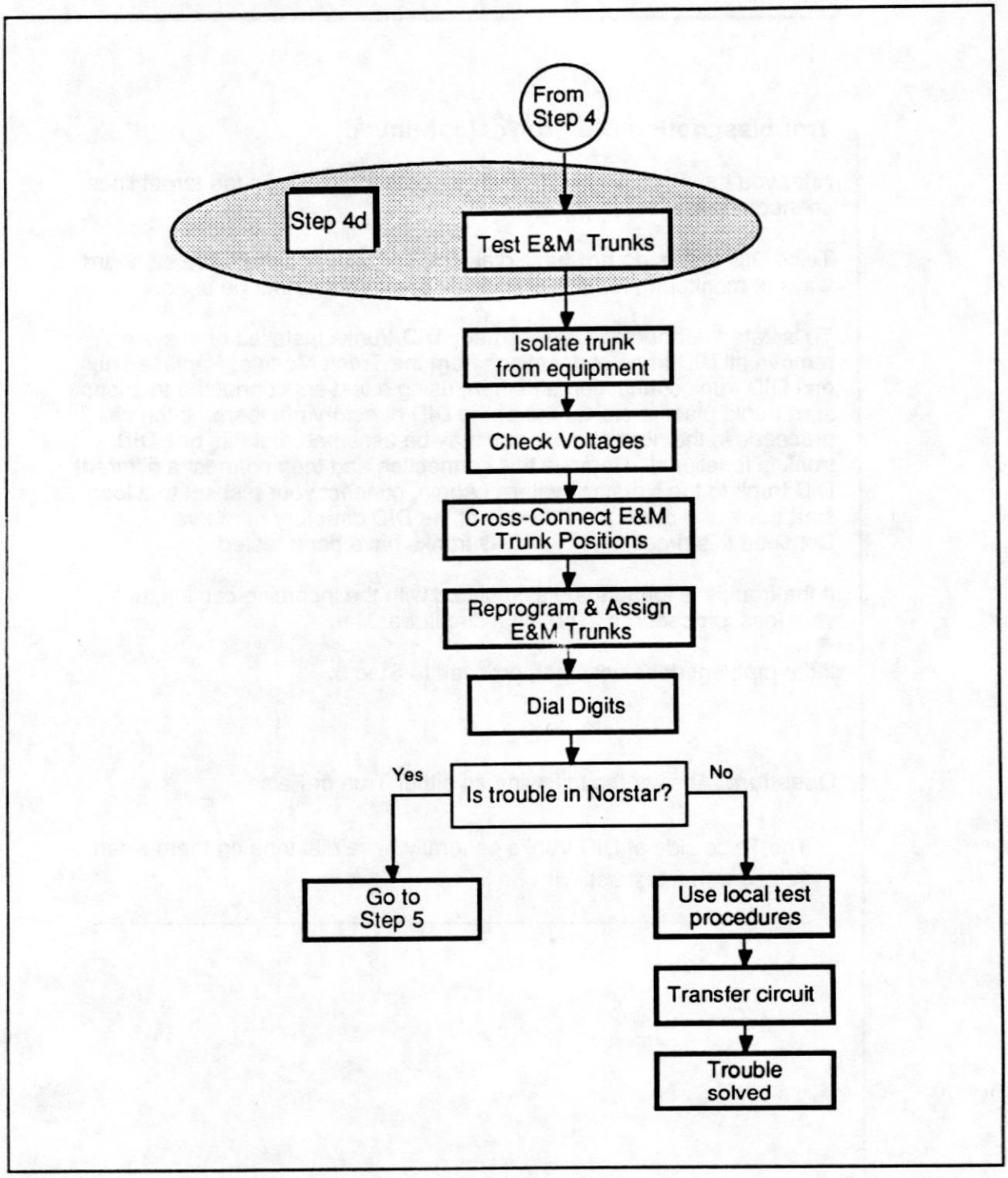
If the problem does not clear, proceed to Step 5.

Question: Answer the following as either True or False.

The Telco side of DID trunks generally have dial tone on them when seized with a test set.

_____

Troubleshooting Chart Step 4d



Answer:

False

Troubleshooting E&M Trunks

If a trouble is suspected to be associated with an E&M trunk, isolate the trunk from the Norstar system by removing the connection at the cross-connect panel.

Voltages on the various voice and signalling leads may be measured with an ohmmeter. The voltages that you can expect to read are given in the following chart.

Voltages on E&M Leads

Leads	Voltage: active	Voltage: inactive
$V_{T\text{-}R}$	125 mV ac on steady dial tone	0 V ac
$V_{T1\text{-}R1}$	125 mV ac on steady dial tone	0 V ac
$V_{E\text{-}SG}$	0V dc to -5 V dc	-48 V dc
$V_{M\text{-}SB}$	0V dc to +2 V dc	-48 V dc

When two Norstar Systems are connected back-to-back via E&M trunks without any loop improvement, the maximum resistance possible is 150 ohms. The chart below indicates the maximum distances possible.

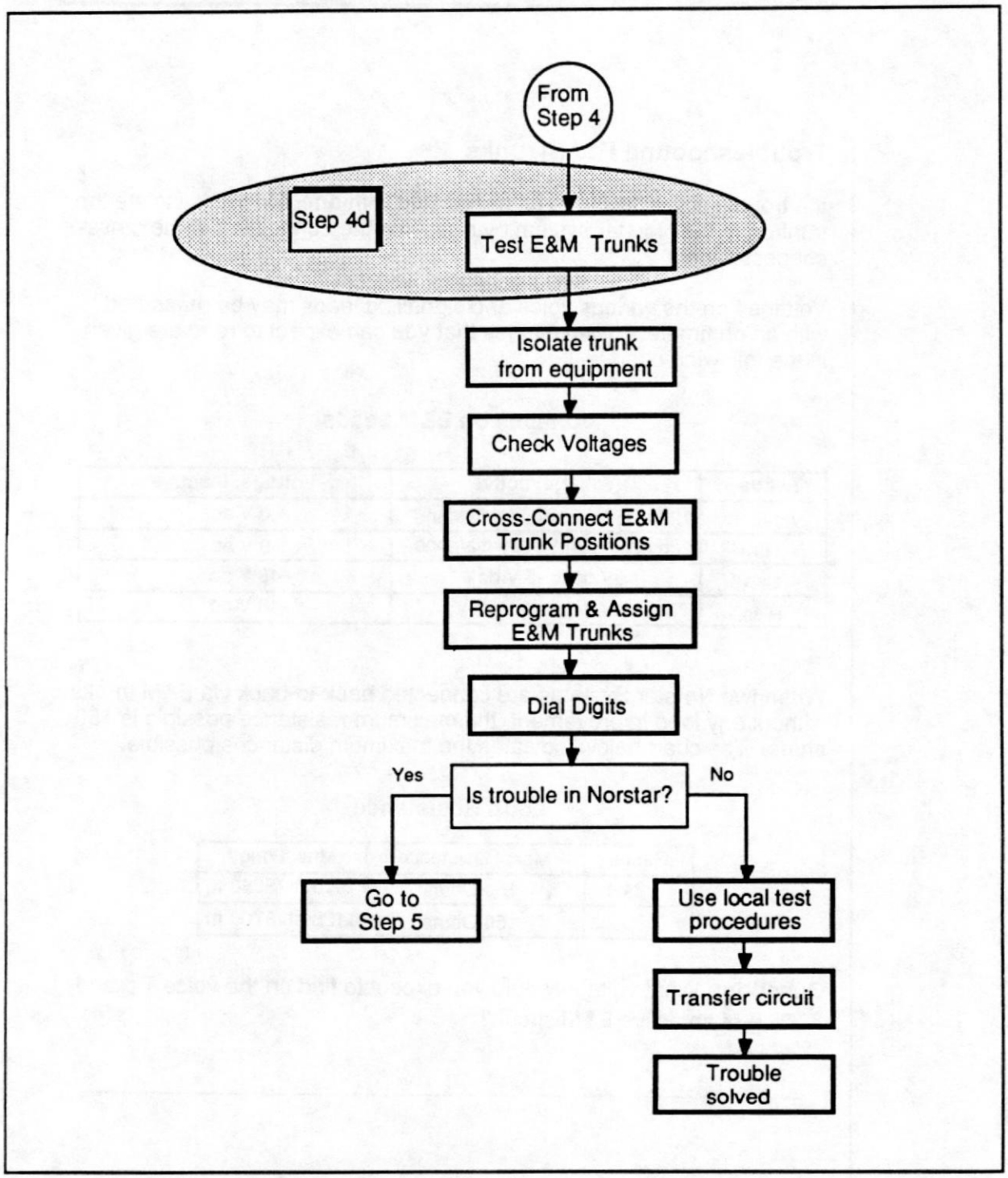
Loop Resistance

Gauge	Max. Resistance	Max. Length
24	150 Ohms	1610 m (5280 ft)
26	150 Ohms	1128 m (3700 ft)

Question: What voltage would you expect to find on the voice Tip and Ring of an active E&M circuit?

_____

Troubleshooting Chart Step 4d



Answer:

125 mV ac on steady dial tone

Troubleshooting E&M Trunks (continued)

After the voltages have been determined to be correct, the voice and signalling leads from one E&M/DISA trunk cartridge position may be connected to the voice and signalling leads of the other position of the same E&M/DISA trunk cartridge, as indicated in the following chart.

Back-To-Back Cross-Connections

First Trunk Position	T	R	T1	R1	E	SG	M	SB
Second Trunk Position	T1	R1	T	R	SB	M	SG	E

The two trunks may then be programmed per the following chart and assigned to a Norstar set.

Test Programming

Trunk Position	Line	Ans Mode	Ans with DISA	Signal	Gain	Dial Mode
First	E&M	Manual		WinkStart	Normal	Tone
Second	E&M	Auto	No	WinkStart	Normal	Tone

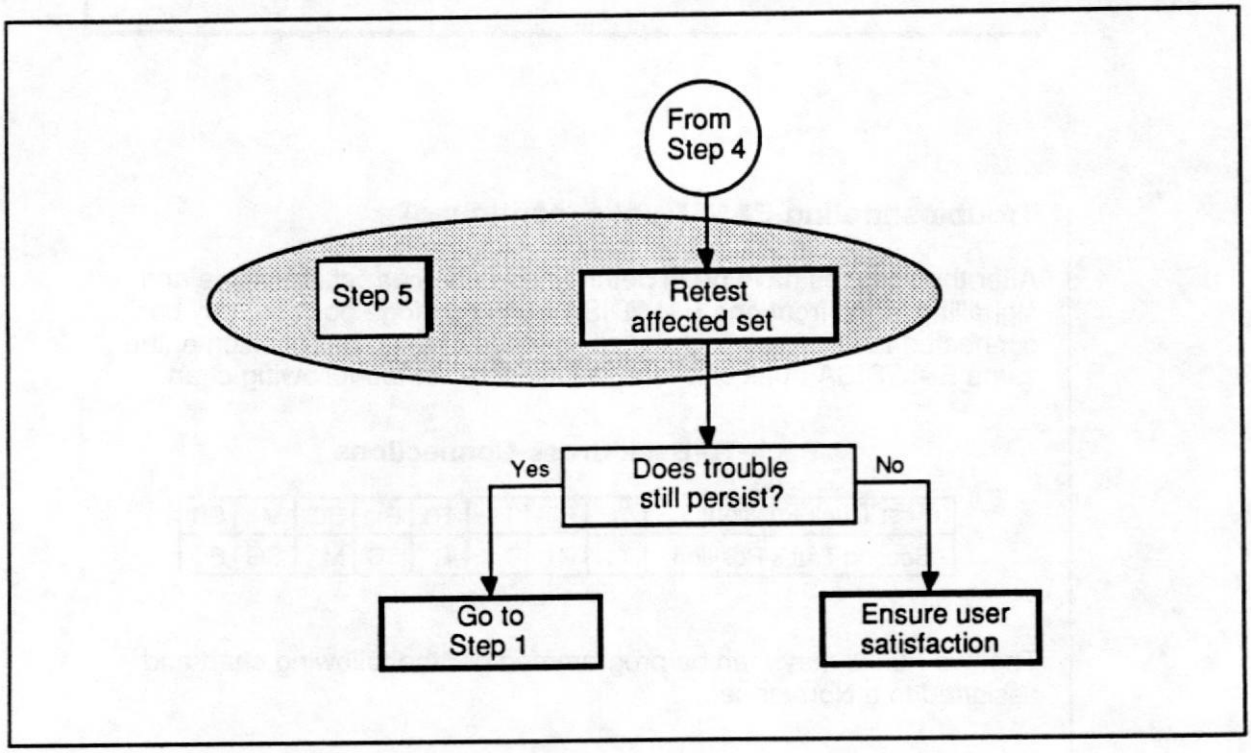
Place a call from the Manual Answer E&M trunk to the Auto-Answer E&M trunk. Dial the digits assigned as the "Received Number" of a target line.

If the E&M trunk cartridge and target lines respond favorably to this type of calling, the trouble may be located within the Private Network facilities. Follow your local procedures to test the interconnecting cable pairs.

Question: From the above chart, what "Signal" setting is used when cross-connecting two E&M trunks?

_____

Troubleshooting Chart Step 5



Answer:

WinkStart

Troubleshooting Step 5

The final step of the troubleshooting procedure is performed after the suspected trouble has been repaired.

Step 5 is performed by retesting the reported trouble from the telephone set that originally reported the problem to verify that the trouble has been fixed. On some occasions more than one trouble may exist and have to be located and repaired.

If another problem exists or if the original problem has not not been solved after performing **all** steps of the troubleshooting procedure, return to Step 1 to gain a more indepth understanding of the nature of the problem.

Always ensure that the customer is satisfied with your work before leaving the job-site.

Question: Give two reasons why it is important to verify that the reported trouble has been fixed.

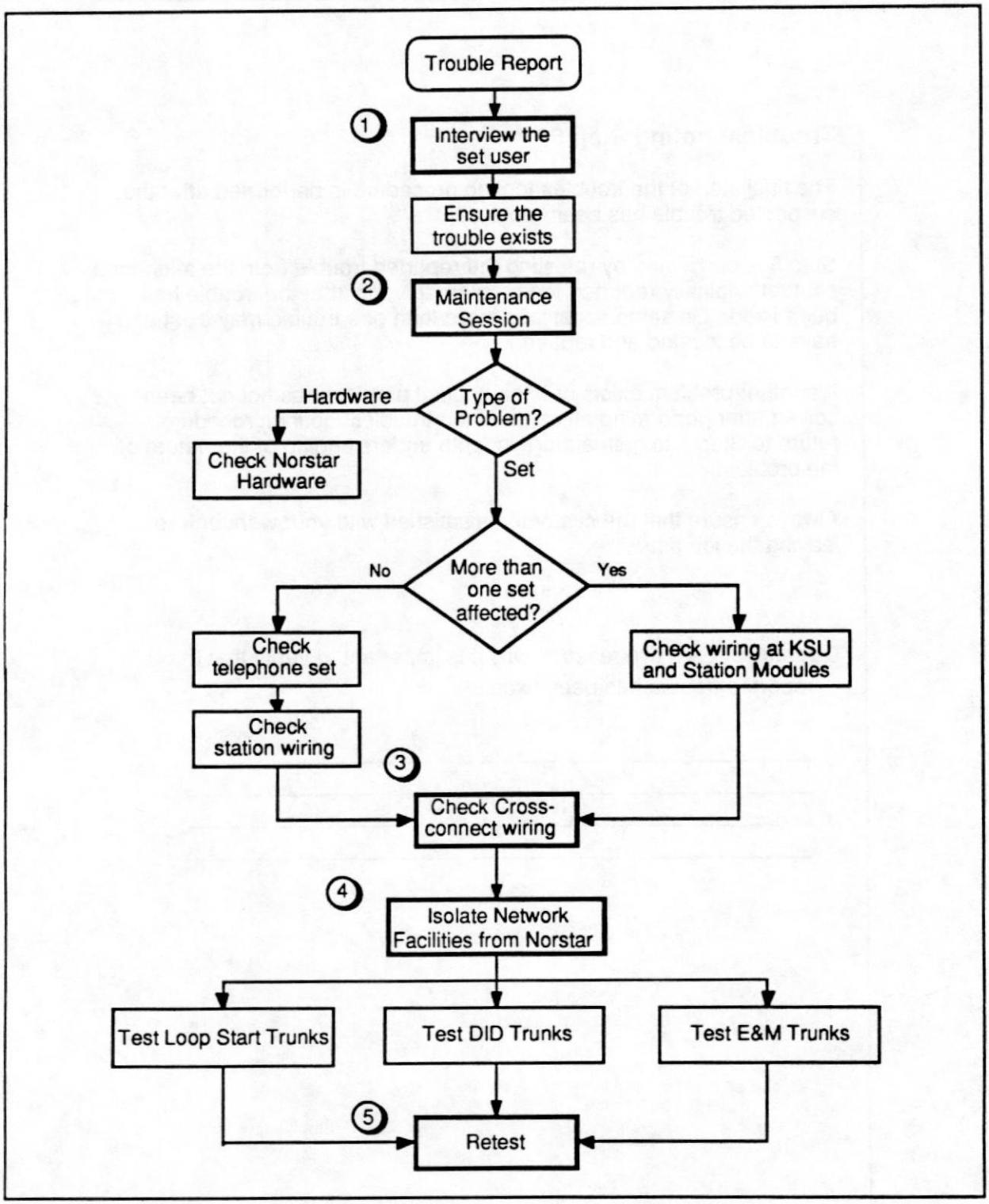
_____

_____

_____

_____

Troubleshooting Chart



Answer:

1. *To ensure that the trouble has been fixed*
2. *To ensure that only one trouble exists*
3. *To ensure customer satisfaction*

REVIEW QUESTIONS

1. List the five main troubleshooting steps, as outlined in this Unit.

   _____

   _____

   _____

   _____

   _____

2. Obtain a meter and measure the voltage on:

   a. port 107 _____

   b. voice T & R of E&M trunk 2 _____
      (activated)

Upon completion, have your course Administrator check your answers.

Course Conclusion

You have now completed the Norstar Modular DR4 Technical Training course.

The course gave you a chance to experience new and enhanced features associated with Norstar DR4. Time permitting, feel free to review any material presented throughout the course. Now would also be a good to read through the Installer Guide and become familiar with its content.

The captive training aid at your student work location has been provided for you to not only practice the work exercises within the course, but also for you to experiment with any features that you may want to try. Feel free to do so before leaving the training center.

ADMINISTRATOR GUIDE

Administrative Information

The Administrator Guide for this course is intended to provide a qualified Course Administrator with the information required to set up a classroom with the necessary training aids. Classroom and hands-on training aids are required to allow the trainee full accessibility to knowledge and work experience of Norstar Modular DR4, prior to field installations and maintenance.

The Administrator Guide contains guidelines for the Course Administrator to follow, on a per lesson basis. Answers to the Unit review questions are contained within the Unit guidelines.

Course Design and Intent

This course has been designed as an Independent Study course in which the trainee works on his own under the guidance of a Course Administrator.

The trainees are allowed to work at their own learning rate, a rate which allows them to learn at their own speed.

Information is presented in manageable portions. At strategic points throughout the course, trainees are required to demonstrate their understanding of the course material by answering questions or performing a work exercise.

In this format, the Norstar Modular DR4 Installation Course provides personal, interactive, consistent, and available training.

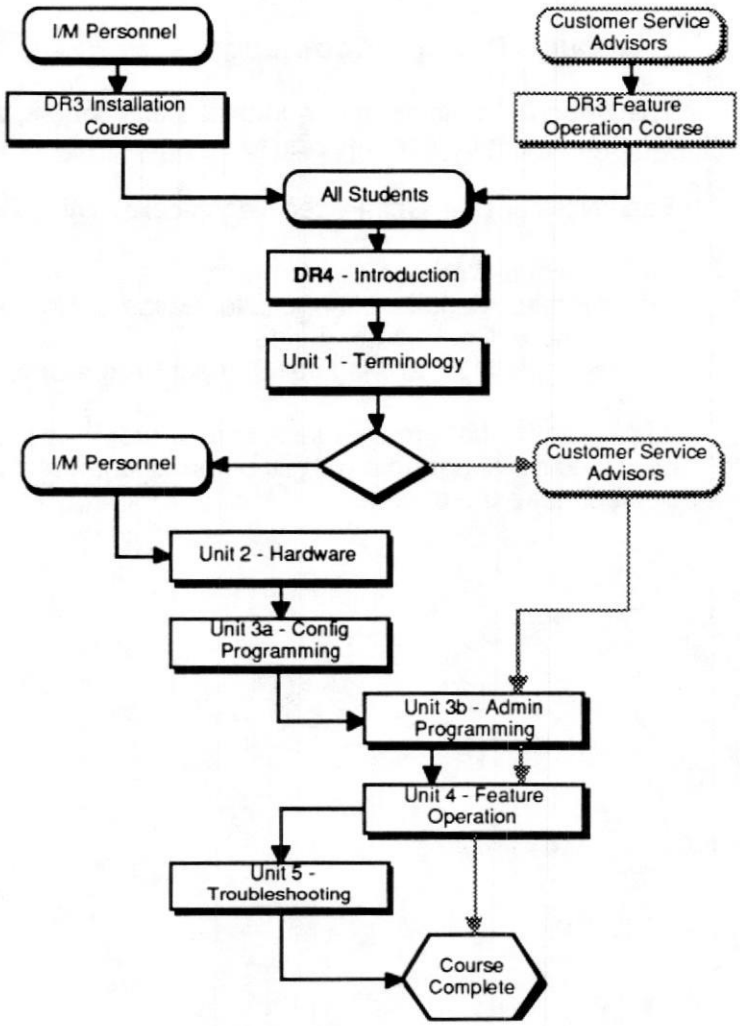
The course takes approximately 8 to 12 hours to complete. As this course is Self-Paced, the time required for successful completion **will vary** according to the trainee's previous level of knowledge and working experience of the Norstar Modular System. The trainee's ability to absorb new material and their practical application work speed will also influence the completion time.

Important: To ensure success of this course, this design must be adhered to.

Course Prerequisites

The content of this course assumes that the participants have acquired the necessary Norstar product knowledge from either the Norstar Modular DR3 Installation Course or from the Norstar Modular DR3 Feature Operation Course. Before attempting the DR4 Technical Training course, the participants must have successfully the required prerequisites.

The following course map shows the required prerequisites along with the direction the student should take in the DR4 Technical Training course dependent on their job function.



Course Administrator Duties

The success of the trainee depends upon the pre-course preparation done by the Course Administrator. There are five basic steps to administering this course.

1. Acquire product knowledge
2. Set-up the training area
3. Set-up the training aids
4. Start the course
5. Course wrap-up

1. Acquire Product Knowledge

The Course Administrator should take this course, as a student, before presenting the course material to trainees.

Each Norstar DR4 Self-Paced Technical Training Course comes with:

- Trainee Workbook.
- Norstar Modular DR4 Installer Guide or Norstar Modular DR4 System Coordinator Guide.
- Sample Norstar Modular Sample Programming Record.

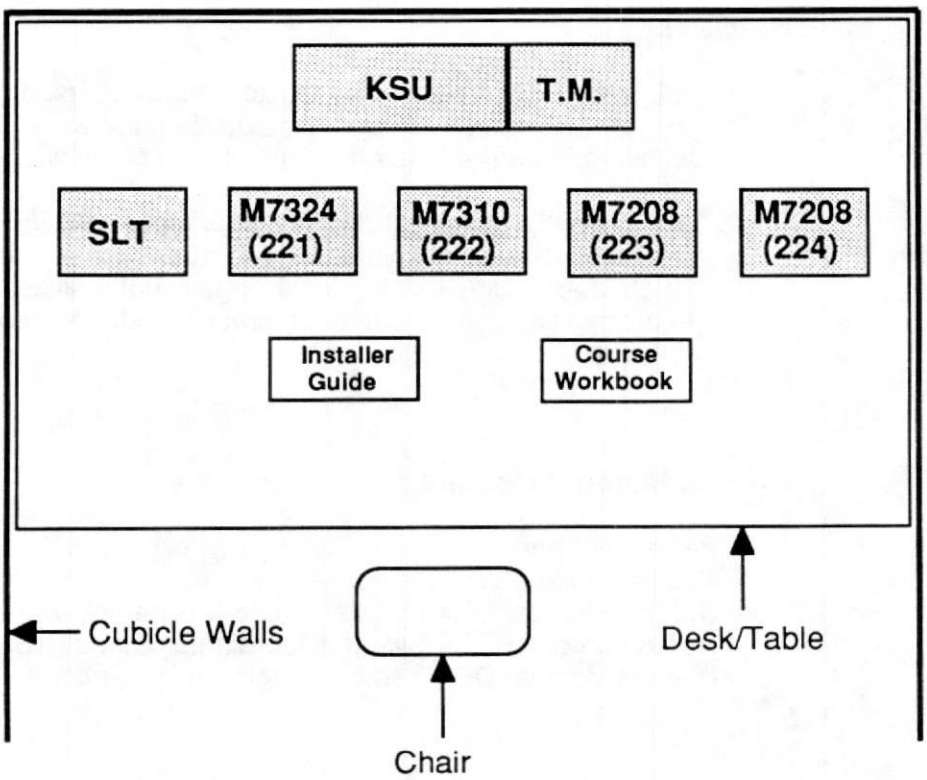
It is essential that the Course Administrator take the time required to become knowledgeable with all of this documentation before any trainees take the course.

2. Set-up the Training Area

As a Course Administrator, you should:

- Arrange for a suitable, quiet training area where the trainee can work without interruption or distraction.
- Ensure that the course material and training aid equipment are available, in place, and in good working order.
- Set out the Trainee Workbook with pens, pencils, and blank paper. It is a good idea to have an extra supply of this material on hand for Trainee use.

Student Work Position



Training Aid Requirements

Each trainee work position requires the following:

- Norstar Modular KSU (M8X24-DS).
- Norstar Modular DR4 Feature Cartridge.
- Norstar Modular Trunk Module.
- Two-Port expansion cartridge.
- E&M Trunk Cartridge
- DID Trunk Cartridge
- One M7324 set.
- One M7310 set
- Two M7208 sets
- One single line tone telephone set (SLT).
- Four Central Office Line. (Three connected to the KSU, one connected to the SLT).
- One DID trunk with four DID numbers.

IMPORTANT:

1. A DS KSU (Disconnect Supervision) **must** be used to complete this course. If a DS KSU is not available, the work exercises within the Feature Operation Unit of the course will not function.

2. An E&M/DISA trunk cartridge is required to supply DTMF receivers for auto-answer loop start trunks connected to the KSU. If an E&M/DISA trunk cartridge is not available, the work exercises within the Feature Operation Unit of the course will not function.

Course Material Required

- Pen and/or pencil
- Trainee workbook
- Norstar Modular DR4 Installer Guide (I/M participant)
- Norstar Modular DR4 System Coordinator Guide (CSA participant)
- Norstar Modular DR4 Sample Programming Record

3. Set-up the training aids

The Course Administrator is required to set up the KSU and telephone sets including all wiring connections.

To ensure the success of the work exercises within the course, the sets and CO Trunks **must** be connected as outlined in the chart below:

Installation Wiring Chart

KSU Port #	Set Type	Station #	Trunk Type
101	M7324	221	
102	M7310	222	
103	M7208 (set 1)	223	
104	M7208 (set 2)	224	
	Single Line		Loop Start
201			Loop Start
202			Loop Start
203			Loop Start
405			E&M
406			E&M
409			DID

E&M Wiring Chart

Port 405			Port 406	
T	Red-Brown	◄——►	T1	Black-Brown
R	Brown-Red	◄——►	R1	Brown-Black
T1	Red-Slate	◄——►	T	Black-Green
R1	Slate-Red	◄——►	R	Green-Black
E	Black-Blue	◄——►	SB	Blue-Yellow
SG	Blue-Black	◄——►	M	Yellow-Blue
M	Black-Orange	◄——►	SG	Slate-Black
SB	Orange-Black	◄——►	E	Black-Slate

Special Training Aid Notes

The E&M/DISA trunk cartridge is connected as shown in the Technical Data section of the Installer Guide. E&M trunk position 1 is cross-connected to E&M trunk position 2 of the same trunk cartridge.

The DID numbers associated with the DID trunk must be programmed to target lines other than target lines 081, 082, 083, or 084. Photo copy page 4d of the programming record as required to accommodate the DID numbers.

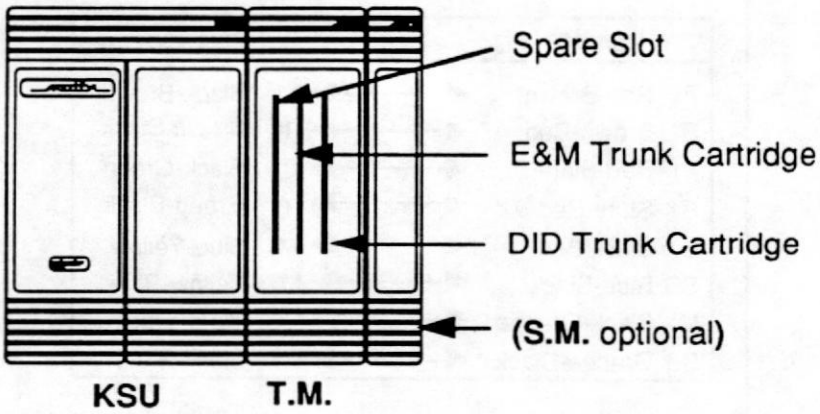
Installation and Maintenance students are required to perform a system Startup. This will set the programming to the default values. System Startup and Configuration programming **must** be performed by the Course Administrator before a CSA becomes a course participant.

Trunk Card Installation

The trunk cards must be installed in the Trunk Module (TM) slots as shown in the diagram below.

Slot 1 has been left spare for the installation of an optional DS Loop Start trunk cartridge. Installing the trunk cartridges other than indicated will result in failure of the course work exercises.

Trunk Cartridge Installation



4. Start the Course

As a Course Administrator, you should explain how each of the following is used throughout the course:

Trainee Workbook - leads the trainee through the course and tests the trainee's understanding of the course material.

Installer Guide - provides reference material for the I/M trainee to complete the course and to use for field installations.

System Coordinator Guide - provides reference material for the CSA trainee to complete the course and to use for assistance when instructing customers.

Programming Record - provides reference material and programming parameters for the Trainee to use when performing Configuration and Administration programming work exercises. Failure to program the training aid as set out in the Programming Record will minimize the effect of the features for Unit 4 - Feature Operation.

Have the trainees begin the course by reading the 'Introduction' in the Trainee Workbook.

Be available to assist the trainee with any questions or problems that they may encounter. Maintain continual availability throughout the course to ensure that the Trainee is not delayed or frustrated enough to cause the trainee to skip material or work exercises, because of no Course Administrator.

5. Course Wrap-up

Upon course completion, administer the Final Quiz to the Trainee. Check the final quiz answers and discuss any areas of concern.

Ensure that the trainee's work position has been left neat and tidy for the next trainee.

Administrator/Trainee Interaction

Introduction

General

The Introduction Unit is to be taken by all students. It introduces the trainee to the Self-paced method of instruction, to the contents of the course, and to the Norstar Modular DR4 product.

Administrator Action

The first job of the Course Administrator is to welcome the trainee to the training facility and to ensure that the trainee has the required course prerequisite:

> Norstar Modular DR3 Installation Course for I/M Personnel
> Norstar Modular DR3 Feature Operation Course for Service Advisors

Explain the benefits of Self-paced Instruction to the trainee and ensure that the trainee reads the Introduction Unit.

Stress to the trainee that all blanks, questions, and work exercises throughout the course **must be** completed, as you will be checking the workbook periodically.

Unit 1 - Terminology

General

Unit 1 - Terminology is intended to be taken by all participants, as outlined in the Course Map. This unit is intended to familiarize the student with the new features of DR4 which relate to networking.

Some of the terms have definitions which the student may have been exposed to in a different context. Ensure that the student does not become confused.

Administrator Action

Answer any questions which may arise pertaining to networking definitions.

At the end of the unit is a review quiz for the trainee to complete. Check the trainee's answers with the answers on the next page. Discuss any differences that the student may have.

Ensure that the trainee fully understands Norstar networking terms before allowing him/her to proceed to the next Unit.

Unit 1 Quiz Answers

Place the name of the circuit or Norstar feature next to the definition which best matches its function.

Trunk	Line	Auto-Answer
DID Trunk	Target Line	Remote Access
E&M Tie-Trunk		DISA

DID Trunk	Allows an external caller to bypass the attendant and call directly to a specific destination.
Trunk	A physical connection between switching machines.
Line	A physical connection between a telephone set and a switching machine.
DISA	Calls are automatically answered by Norstar, System security may be preserved through the use of a password.
Target Line	A communications path set up when Norstar matches received digits to a called destination.
E&M Tie-Trunk	A physical connection between switching machines within a private network.

Unit 2 - Hardware

General

Unit 2 - Hardware is intended to be taken by Installation and Maintenance personnel , as outlined in the Course Map.

This unit presents the two new Norstar Modular trunk cartridges:

- DID Trunk Cartridge
- E&M/DISA Trunk Cartridges

Wiring diagrams contained within the course only contain connection information for Trunk Cartridges installed in the first slot of a Trunk Module. Have the student refer to the Technical Data section of the Installer Guide for complete wiring charts.

This Unit presents detailed Feature Cartridge upgrade procedures for upgrading a Norstar Modular System from :

- DR2 to DR4
- DR3 to DR4

Administrator Action

Answer any questions which may arise pertaining to telephone set or equipment installation and interconnections.

At the end of the unit is a review quiz for the trainee to complete. Check the trainee's answers with the answers on the next page.

Unit 2 Review Answers

1. What is the maximum number of E&M Trunks which may be interfaced into the Norstar through one Trunk Module?

   Six

2. Give the function of the spare DTMF receivers on the E&M Trunk Cartridge.

   Used for Loop Start DISA Trunks to decode incoming digits

3. A new DR3 Feature Cartridge is one that the **Time** and **Date** have never been changed.

4. List the two major steps required when upgrading from DR2 software to DR4 software.

   Upgrade from DR2 to DR3

   Upgrade from DR3 to DR4

5. Each DID Trunk Cartridge interfaces **Four** DID trunks into a Norstar System.

6. If a Norstar System contained 2 DID trunk cartridges, how many CCI pairs would you suggest be installed for DID trunk cartridge monitoring?

   Two

Unit 3a - Configuration Programming

General

Unit 3a - Configuration Programming is intended to be taken by Installation and Maintenance personnel , as outlined in the Course Map.

A brief review of programming and the Programming Record is presented. Only new and enhanced features of DR4 are explained. The unit does not contain programming information pertaining to features common to other versions of Modular software. Programming information for all programmable parameters is located in the Installer Guide.

Administrator Action

The Course Administrator should be prepared to offer a review of Norstar Modular programming techniques to those trainees who may require refreshing, on the Norstar Modular features and method of programming.

Ensure that the trainee programs the captive training aid to the parameters set out in the Sample Programming Record. Spot check the trainee's work exercises to ensure that all features are programmed according to the Sample Programming Record. Failure to adhere to the work exercises may cause confusion and/or frustration in the "Feature Operation" unit of the course.

This unit does not contain an end-of-unit quiz. In place of the quiz, the student is required to complete the programming associated with the Configuration level of programming. Spot-Check some of the parameters to ensure that programming has been performed correctly.

Unit 3b - Administration Programming

General

Unit 3b - Administration Programming is intended to be taken by all participants, as outlined in the Course Map

Administrator Action

Before a CSA trainee enters the classroom, the Course Administrator should perform a system Startup and program the Configuration level of programming.

The Course Administrator should be prepared to offer a review of Norstar Modular Administration programming techniques to those trainees who may require refreshing, on the Norstar Modular features and method of programming.

Ensure that the trainee programs the captive training aid to the parameters set out in the Sample Programming Record. Spot check the trainee's work exercises to ensure that all features are programmed according to the Sample Programming Record. Failure to adhere to the work exercises may cause confusion and/or frustration in the "Feature Operation" unit of the course.

This unit does not contain an end-of-unit quiz. In place of the quiz, the student is required to complete the programming associated with the Configuration level of programming. Spot-Check some of the parameters to ensure that programming has been performed correctly.

Unit 4 - Feature Operation

General

Unit 4 - Feature Operation is intended to be taken by all participants, as outlined in the Course Map

The Feature Operation unit of the course allows the trainee to experience set and feature operation, of the new and enhanced features associated with Norstar Modular DR4.

Administrator Action

Ensure that the trainee performs all work exercises in this unit to gain practice and knowledge of system and feature operations.

Check the end of unit review questions with the following answers. Discuss any questions that the trainee may have.

If your student is a CSA, the student has now completed the DR4 Technical Training Course.

Unit 4 Review Answers

Answer the following statements as either True or False.

1a. The Direct dial number can be a digit from 0 to 9 dependent on numbers assigned in the Norstar numbering plan.

TRUE

1b. When the Direct dial number programming is set to "none" the Direct Dial feature will be disabled..

TRUE

2. Selective Line Redirection does not allow intercom numbers to be externally forwarded.

TRUE

3. An unsupervised conference can be made by a Norstar set placing two outgoing external calls

FALSE

4. Dialing filters can be used as set filters, line filters, line/set filters, and as remote filters applied to lines.

TRUE

5. A COS password cannot override a restrictive dialing filter applied as a remote filter when accessing a Norstar System remotely.

FALSE

6. Auto Answer trunks programmed to answer with DISA require the caller to enter a COS password.

TRUE

Unit 5 - Troubleshooting

General

Unit 5 - Troubleshooting is intended to be taken by Installation and Maintenance personnel , as outlined in the Course Map.

Administrator Action

Students unfamiliar with troubleshooting techniques relating to networking may require some suggestions pertaining to local policies.

Check the end of unit review questions with the answers on the following page. Discuss any questions that the trainee may have.

Hand out the final quiz and then check the final quiz answers with the trainee and discuss any differences. If time permits, allow the trainee to experiment with other features that he/she may want to try.

The student has now completed the DR4 Technical Training Course.

After the student has completed the course, ensure that the work position is neat and tidy for the next student.

Unit 5 Review Answers

1. List the five main troubleshooting steps, as outlined in this Unit.

   Step 1 - Interview the set user

   Step 2 - Perform a Maintenance Session

   Step 3 - Check the Cross-Connect Wiring

   Step 4 - Isolate the Network Facilities from Norstar

   Step 5 - Retest the affected set

2. Obtain a meter and measure the voltage on:

   a. port 107 **Between 15 and 20 Vdc**

   b. voice T & R of E&M trunk 2 (activated) **Approx. 125mVac**

Norstar Modular DR4 Final Quiz - Answers

1. Answer the following statements as either True or False.

   - The Unsupervised Confernece feature does not require the use of disconnect supervision hardware.
   False

   - The digit of the Call Park Prefix code when programmed to "None" disables the feature.
   True

   - The Answer With DISA option of auto-answer trunks provides security access to Norstar by remote callers.
   True

   - Incoming calls on an auto-answer E&M trunk configured to answer without DISA requires the use of a password to obtain system dial tone.
   False

   - Class of Service passwords can be assigned in various areas of programming to restrict levels of service and also to provide levels of service.
   True

   - Line 044 of a Norstar Modular DR4 System may be programmed as a target line.
   False

   - Norstar Modular DR4 only supports Type II E&M signalling.
   True

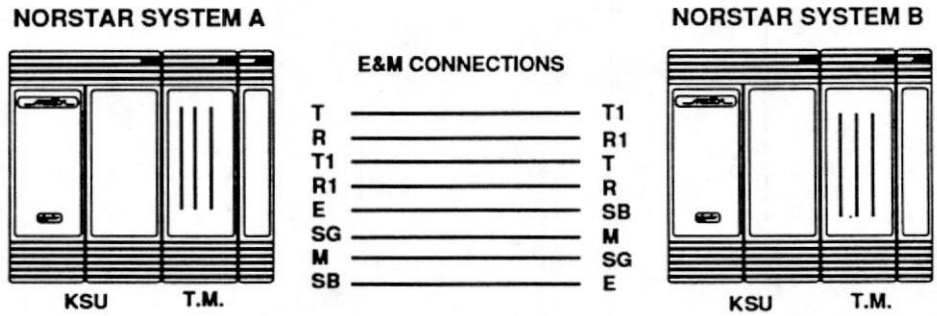
   - Power to the KSU and all trunk and station modules should be disconnected when performing feature cartridge upgrades.
   True

2. Give the DR4 system capacity for the following:
   Line Pools **15**
   Target Lines **104**

3. Give the Feature Codes for the following:
   Selective Line Redirection ƒ•
   Remote Page • Ø

Norstar Modular DR4 Final Quiz - Answers (continued)

4. The following diagram shows two Norstar Systems connected via E&M trunks to form a Private Network. On System 'B', write the lead designations that you would connect to from System 'A'.



5. Using the above diagram and referencing the Technical Daata section of the Installer Guide, list the wire colors that would be used to connect the two systems together vis an E&M trunk.

   - System 'A' has an E&M card in slot 2. Use trunk position 1.
   - System 'B' has an E&M card in slot 3. Use trunk position 2.

System 'A'		System 'B'	
Lead Designation	Wire Color	Lead Designation	Wire Color
T	Red-Brown	T1	Violet-Orange
R	Brown-Red	R1	Orange-Violet
T1	Red-Slate	T	Violet-Blue
R1	Slate-Red	R	Blue-Violet
E	Black-Blue	SB	Brown-Violet
SG	Blue-Black	M	Violet-Brown
M	Black-Orange	SG	Green-Violet
SB	Orange-Black	E	Violet-Green

Upon completion of the quiz, have your Course Administrator check your answers.

Norstar Modular DR4 Final Quiz **Student Name** _____

1. Answer the following statements as either True or False.

   - The Unsupervised Conference feature does not require the use of disconnect supervision hardware.

     _____

   - The digit of the Call Park Prefix code when programmed to "None" disables the feature.

     _____

   - The Answer With DISA option of auto-answer trunks provides security access to Norstar by remote callers.

     _____

   - Incoming calls on an auto-answer E&M trunk configured to answer without DISA requires the use of a password to obtain system dial tone.

     _____

   - Class of Service passwords can be assigned in various areas of programming to restrict levels of service and also to provide levels of service.

     _____

   - Line 044 of a Norstar Modular DR4 System may be programmed as a target line.

     _____

   - Norstar Modular DR4 only supports Type II E&M signalling.

     _____

   - Power to the KSU and all trunk and station modules should be disconnected when performing feature cartridge upgrades.

     _____

2. Give the DR4 system capacity for the following:

   Line Pools _____

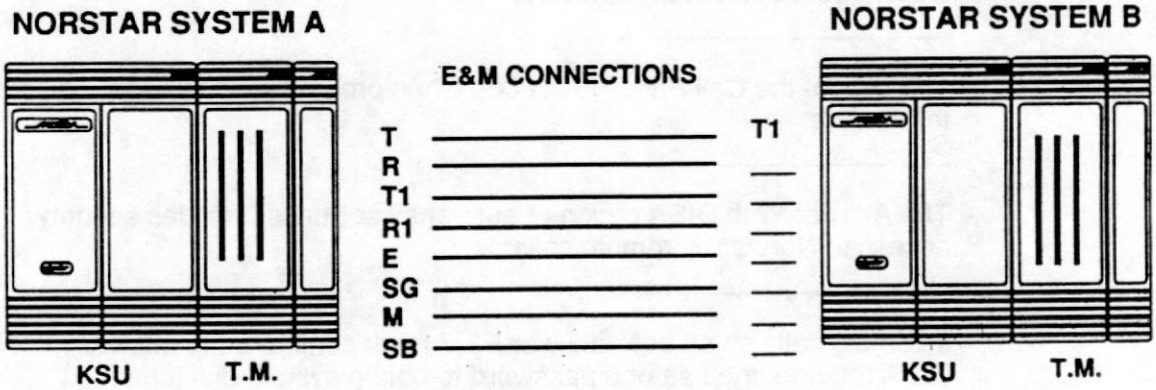
   Target Lines _____

3. Give the Feature Codes for the following:

   Selective Line Redirection _____

   Remote Page _____

4. The following diagram shows two Norstar Systems connected via E&M trunks to form a Private Network. On System 'B', write the lead designations that you would connect to from System 'A'.



5. Using the above diagram and referencing the Technical Data section of the Installer Guide, list the wire colors for System 'A' and list the lead designations and wire color of System 'B' that would be used to connect the two systems together vis an E&M trunk.

- System 'A' has an E&M card in slot 2. Use trunk position 1.
- System 'B' has an E&M card in slot 3. Use trunk position 2.

System 'A'		System 'B'	
Lead Designation	Wire Color	Lead Designation	Wire Color
T			
R			
T1			
R1			
E			
SG			
M			
SB			

Upon completion of the quiz, have your Course Administrator check your answers.

Norstar Modular DR4 Final Quiz **Student Name** _____

1. Answer the following statements as either True or False.

   - The Unsupervised Conference feature does not require the use of disconnect supervision hardware.

     _____

   - The digit of the Call Park Prefix code when programmed to "None" disables the feature.

     _____

   - The Answer With DISA option of auto-answer trunks provides security access to Norstar by remote callers.

     _____

   - Incoming calls on an auto-answer E&M trunk configured to answer without DISA requires the use of a password to obtain system dial tone.

     _____

   - Class of Service passwords can be assigned in various areas of programming to restrict levels of service and also to provide levels of service.

     _____

   - Line 044 of a Norstar Modular DR4 System may be programmed as a target line.

     _____

   - Norstar Modular DR4 only supports Type II E&M signalling.

     _____

   - Power to the KSU and all trunk and station modules should be disconnected when performing feature cartridge upgrades.

     _____

2. Give the DR4 system capacity for the following:

   Line Pools _____

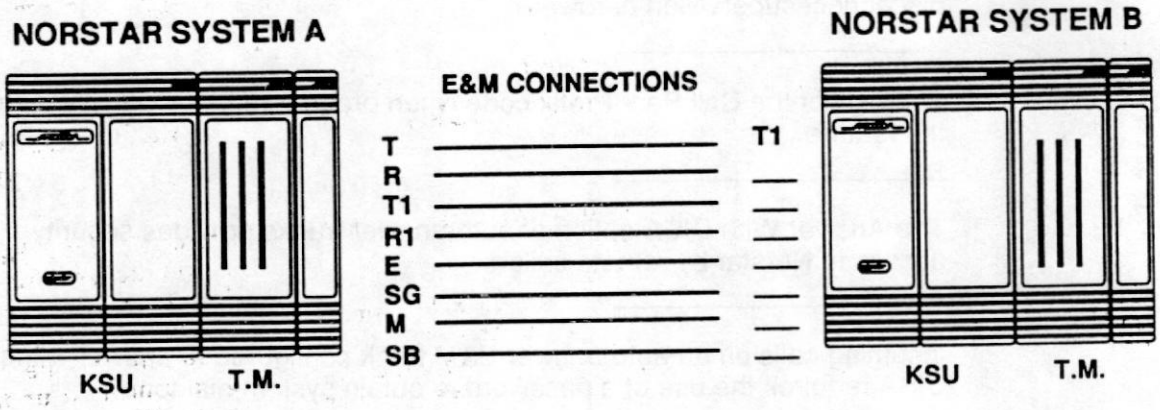
   Target Lines _____

3. Give the Feature Codes for the following:

   Selective Line Redirection _____

   Remote Page _____

4. The following diagram shows two Norstar Systems connected via E&M trunks to form a Private Network. On System 'B', write the lead designations that you would connect to from System 'A'.



5. Using the above diagram and referencing the Technical Data section of the Installer Guide, list the wire colors for System 'A' and list the lead designations and wire color of System 'B' that would be used to connect the two systems together vis an E&M trunk.

- System 'A' has an E&M card in slot 2. Use trunk position 1.
- System 'B' has an E&M card in slot 3. Use trunk position 2.

System 'A'		System 'B'	
Lead Designation	Wire Color	Lead Designation	Wire Color
T			
R			
T1			
R1			
E			
SG			
M			
SB			

Upon completion of the quiz, have your Course Administrator check your answers.

norstar international news

Nov 1991

BRITISH TELECOM LAUNCH NORSTAR MODULAR IN U.K.

Norstar success in the UK continued with the launch of Norstar Modular in October 1991.

After 10 very successful months and over 15,000 Compact system sales, Norstar Modular was launched to the BT sales force at a number of events held throughout the UK. At the launch events the BT salesforce were given presentations on the new product and an opportunity to participate in a hands -on demonstration.

BT also used the launch events to announce their strategy in the small and medium switch market in the U.K. From January 1, 1992 BT will rationalise their product portfolio to promote Norstar Modular as their primary product in the medium switch market.

Norstar Modular is expected to add to the achievements of Compact, following very positive feedback from all the Modular field trial sites and an enthusiastic response to the product from the BT sales force. (Ilyas Sadiq, NT UK)

GLOBAL MANDATE

Effective November 1, 1991, The Product Line Management (PLM) Group at Private Networks Calgary, has reorganised for our global mandate. Those of you effected by these changes have been notified. If you need more information please contact PLM.

VOICE OF AMERICA LOCKS IN NORSTAR

Literally! Fred Haney, Manager Belize Relay Station, Belize City, Central America chained his Modular KSU to the backboard it is mounted on. He says, "It has become an integral part of his operation and he doesn't want to risk losing communication under any circumstances." The radio relay station located in Belize is a model for future stations throughout the world and he would like to see the Norstar Modular standardised and operating throughout the Voice of America chain.

Fred was impressed by the reliability, flexibility and data applications that Norstar offers. He expects to save a considerable amount of money in the future with Norstar. (Keith Paul, NT CALA)

SAUDI MINISTRY IMPRESSED WITH THE DESIGN OF NORSTAR SETS

When senior executives at the Ministry of Petroleum of Saudi Arabia moved to a new building, they specifically asked for Norstar Modular systems to be installed behind their Northern Telecom SL-1 system. This request was prompted by the executives seeing a Compact system in an old building. They liked the design of Norstar sets.

TELECOM '91

Over 900 exhibitors displayed state of the art telecommunications equipment and technology at Telecom '91, the largest international telecommunications event. The complete family of Norstar products including terminals and PC-based applications were there at the Northern Telecom pavilion.

Particular attractions of the Norstar Portfolio were Startalk and the M7900 terminal. Most notably, the Norstar M7900 demonstrated Norstar as a leader in terminal design. It provides a touch screen unlike any others used by our competitors and allows users to touch words and symbols to activate features. The M7900 did attract a great deal of attention, particularly from our competitors.

Distributors were impressed by Norstar's 'value package'. For instance, the design philosohy of Norstar provides value in its default programming on all terminals. The warehousing and technical support offered by Northern Telecom also provides value to distributors. After one such meeting on Norstar, one distributor of a competitor's product ended up asking if he could also distribute Norstar. Norstar was presented as a platform for access to network services through Centrex, ISDN, and CMS which present new revenue opportunities for distributors.

Several hundred leads were generated for potential Norstar sales. These leads have been forwarded and are being followed-up by our marketing organisations. (Carl Price, Private Networks, Calgary)

AT A GLANCE A MINI-KNOCKOFF ....

Sometimes a competitors product can be the best Norstar sales aid available. We bought a Nitsuko Group V4 set in Saudi Arabia. We discovered useful information can be gathered by glancing at a competitor's system.

For Instance, compare Norstar ....

The textured attractive plastic of a Norstar is resistant to scratches and does not collect or show dirt as easily as the smooth plastic of the Nitsuko telephone sets.

The Norstar telephone has flexible programmable keys which can be used without a manual and can be labelled easily. The Nitsuko set has fixed programmable line keys which are inflexible and difficult to use without a manual.

Studies have shown that the quality of handsfree is linked to the distance between the microphone and the speaker. Norstar has positioned these as far away as possible. The microphone and speaker are together on other systems.

These are only a few of Norstar's advantages over other systems. Take a glance at another system and discover other advantages of Norstar.

NORSTAR ON TOP OF THE WORLD!

Just a few miles short of the North Pole, in the most northerly community in Europe called NorthCape, TBK our distributor in Norway installed a 6X16 system. Again, Norstar provides solutions in small business communications systems and with this sale Norstar can literally claim its position of being on top of the world.

ALGERIA FIRST TO ORDER MODULAR DR4

The first order for Norstar Modular DR4 systems was a large one (150 systems for the Ministry of Defence in Algeria). (Jacques Cadro, NT Middle East)

SAUDI PRINCE INSTALLS NORSTAR IN HIS OWN RESIDENCE

Prince Turki Bin Nasser head of the Royal Saudi Air Force in Riyadh liked Norstar systems so much he had it installed into his own two residences.

NORSTAR SALES CONTEST IN UK

To promote sales of the then newly launched Norstar Compact, NT UK ran a very successful sales incentive entitled the "Calgary Norstar Competition" for the BT (British Telecom) sales force. Over 20 competition winners and their partners visited Calgary and enjoyed the spectacular scenery of the surrounding mountain areas of Banff and Lake Louise, with the highlight of the trip being the infamous Calgary Stampede. The success of the Calgary Norstar Competition is reflected in the contining successful sales performance of Norstar. A new competition has been introduced for 1992. The details will follow in the next issue.
(Ilyas Sadiq, NT UK)

Should you want to offer a sales contest of this kind during the stampede (July'92) start planning now.

NORSTAR MILESTONE !

Since its introduction in 1988, we have now built over 2.2 million Norstar telephone sets. Every week, we manufacture 20,000 sets and 2000 systems. Thanks to our team efforts, these sets are being used by small businesses in over 45 countries.

This newsletter is intended to enhance communication between us, the product organization and the marketing organizations. Thus, we will be coming to you for articles to publish. If you have had a recent success in international sales, a feature of a successful distributor, or a story of a successful marketing program (eg. Try and Buy, product launch) to share, please, submit these stories by the month prior to the month of the newletter's publication.

The Norstar International News is produced by the International Product Management Department in Calgary, Alberta (the little ◊ on the map in our banner gives the location of Calgary). We welcome your comments and/or contributions, please forward them to Shirley Cotterill at PNC ESN 775-7412.

Natalie Reeves
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